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WELL 30/9-20 S, LICENCE 104

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Final Well Report

Well 30/9-20 S

LIST OF CONTENTS, WELL 30/9-20 S

PREFACE

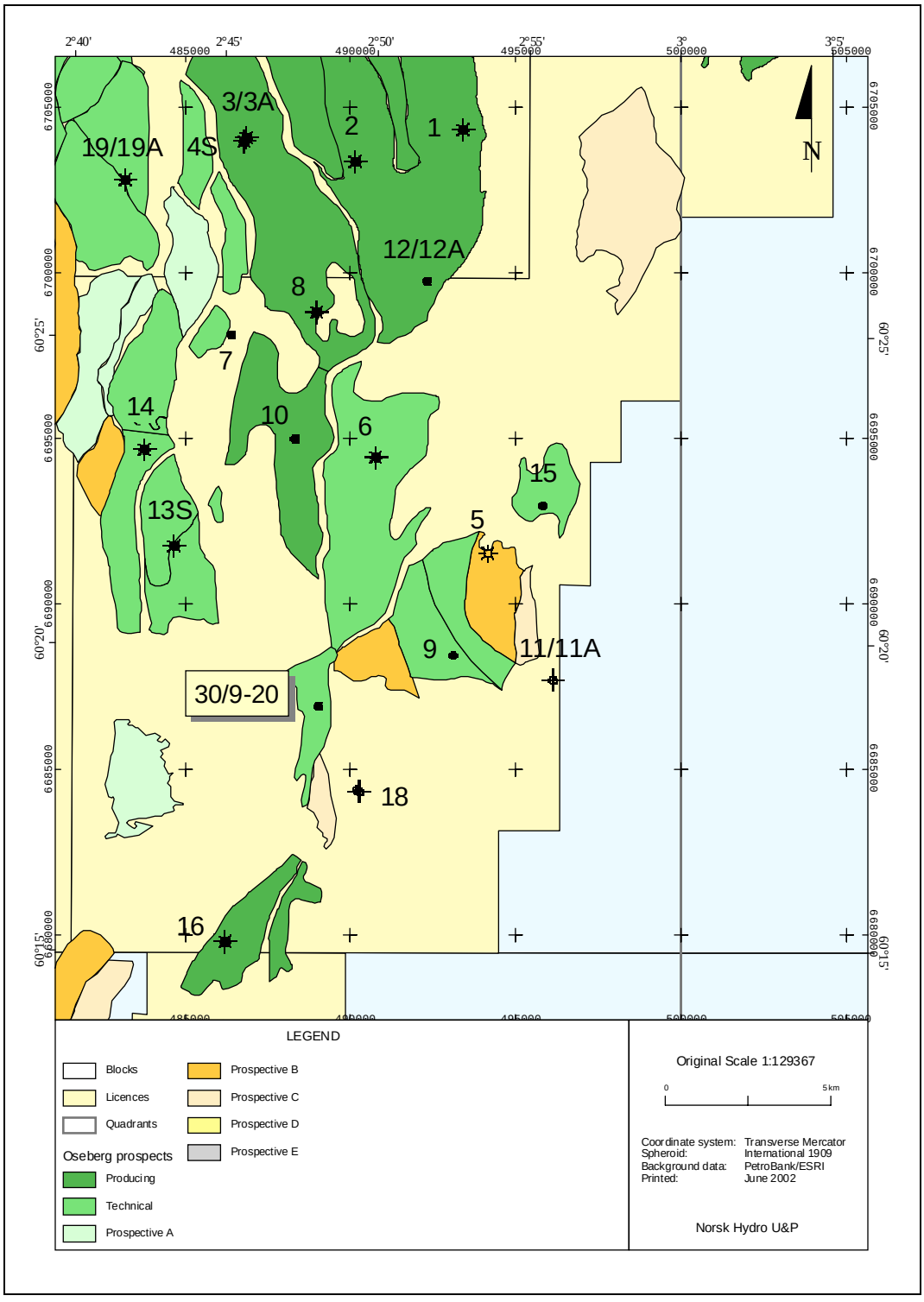
The license percentage share of the block is as follows:

Hydro ASA(operator)	34 %
Statoil ASA	20 %
Conoco	11 %
ExxonMobil	5 %
Petoro AS	30 %

The well was drilled by Norsk Hydro ASA., on behalf of the group, during January/February 2002 (see Location Map, page 3).

All depths in this report are mMD RKB unless otherwise stated.

Location map: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2°45'
490000
2°50'
495000
2°55'
500000
3°
505000
3°5'
6705000
6700000
6695000
6690000
6685000
6680000
60°25'
60°20'
60°15'
3/3A
2
1
19/19A
4S
12/12A
8
7
14
10
6
15
13S
5
9
11/11A
30/9-20
18
16
N
LEGEND
Blocks
Licences
Quadrants
Oseberg prospects
Producing
Technical
Prospective A
Prospective B
Prospective C
Prospective D
Prospective E
Original Scale 1:129367
0
5km
Coordinate system: Transverse Mercator
Spheroid: International 1909
Background data: PetroBank/ESRI
Printed: June 2002
Norsk Hydro U&P

SUMMARY OF WELL DATA	
LOCATION:	Geo: 60° 19' 01.65" N 02° 48' 03.41" E UTM 6 686 903.2m N 489 003.2m E ED 50, UTM Zone 31, SM 3°E
OPERATOR: RIG: CONTRACTOR:	Norsk Hydro Transocean Arctic Transocean Sedco Forex
KB ELEVATION (to MSL): WATER DEPTH (MSL):	24m 101m
START OF OPERATIONS: WELL SPUDDED: WELL RE-SPUDDED: WELL REENTERED: WELL SIDETRACKED: REACHED TD ON: COMPLETED: STATUS: FORMATION AT TD:	2002-01-07 2002-01-09 No-re spud No re-entry No Sidetrack 2002-01-30 Plugged and abandoned as an oil discovery Drake Formation
TD DRILLER (mRKB): TD LOGGER (mRKB):	3124 m MD 3124 m MD
DRILLING DEPTHS:	36" to 200 m 26" to 400 m 20" to 630 m 17 1/2" to 1297 m 12 1/4" to 2369 m 8 1/2" to 3124 m
CASING DEPTHS:	30" to 198 m 20" to 398 m 16"liner to 621 m 13 3/8" to 1291 m 9 5/8" to 2362 m

SECTION A

GEOLOGY

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FIGURES PAGE

TABLES

APPENDICES

1 Objectives

The well 30/9-20S was an exploration well, located in the Oseberg Sør field area, in block 30/9 on the R prospect of the PL104 Oseberg Sør Unit.
The main objectives of the well was to prove sufficient volumes of oil and/or gas in The Brent deltaic sands of the Tarbert Formation, and additional potential within the Ness and Oseberg-Rannock-Etive formations, and to confirm the seismic interpretation. The R prospect is located between the K-west and the Omega structures.

2 Results

The well was spudded 9 January 2002 and reached a total depth of 3124m MD RKB in Drake Fm. on 30 January 2002. The well was permanently plugged and abandoned as an oil discovery well 11 February 2002.

The main results were as follows:
Both the Tarbert 4 (Lower Heather Sandstone) and the Tarbert 3 (Upper Tarbert) Formations proved to be oil bearing. A total gross hydrocarbon column of 65.8 m TVD was found in Lower Heather and Tarbert, of this 10.8 m in Upper Tarbert. A pressure barrier (0.5bar) was interpreted internally in the Lower Heather oil column.

A total of 72,65m core was recovered over the major sandstone interval. The core shows a homogeneous, generally finegrained sand sequence which are both silica and calcareous cemented. The transitions from Middle (Tarbert 2) to Upper Tarbert (Tarbert 3) and from Upper Tarbert to Lower Heather are both characterized by interpreted ravinement surfaces due to transgressions. Depositional environments range generally from lower to middle shoreface. Upper Tarbert represents fair reservoir quality while Lower Heather represents a poor, low permeabiliy reservoir.

3 Biostratigraphy

The biostratigraphical evaluation of well 30/9-20S was carried out by Geostrat Ltd. Micropalaeontological and palynological analyses have formed the basis for the biostratigraphical interpretation of the well. The analyses were carried out on cuttings, sidewall cores and core samples. 129 ditch cuttings samples were analysed for micropalaeontology. For Palynology 158 cuttings, 11 sidewall and 11 core samples were analysed.
The results are documented in the report "Norsk Hydro Well 30/9-20S Biostratigraphy of the interval 425m - 3123m".
Tables 3.1 and 3.2 shows a summarised geochronological and lithostratigraphical sub-division of the well. The interpretation is in accordance with Norsk Hydro's standard zonation for the area.

Major points

- The youngest sediments analysed at 425m are of Late Pliocene age

- The oldest sediments at 3123m are of Late - Middle Toarcian age

- The Hordaland Group was penetrated at 843m (log)

- The Rogaland Group was penetrated at 2075m (log)

- The Shetland Group was penetrated at 2360,5m (log)

- The Cromer Knoll Group was penetrated at 2703m (log)

- The Viking Group was penetrated at 2750m (log)

- The Brent Group was penetrated at 2806m (log)

- The Dunlin Group was penetrated at 3072m (log)

Several stratigraphical breaks are registered in the well
A stratigraphical break is seen between the Nordland Group and the Hordaland Group, where sediments of the earliest Middle Miocene are missing

An unconformity is also seen between the Rogaland Group and the Shetland Group where sediments of the earliest Early Paleocene are missing.

Within the Shetland Group a break is seen between the Kyrre Formation and the Svarte Formation. Here Santonian sediments overlie sediments from the Late Cenomanian.

A stratigraphical break is seen between the Rødby Formation and the Åsgard Formation (Cromer Knoll Group), where sediments of Late Albian age rest on sediments of Aptian-Barremian age.

The Draupne Formation (Viking Group) is present (log pick) but not dated, a stratigraphical break is inferred above and below the Draupne Formation.

The underlying Heather Formation is dated to Late - Middle Bathonian age.

Between the Brent Group and the Dunlin Group another stratigraphical break is seen. Here the Dunlin Group is overlain by the Ness Formation. Sediments of Aalenian age are present in the well, but sediments of earliest Early Bajocian and latest Late Toarcian age (lower Brent Group) are missing.

Biostratigragraphic summary of the sand units
Reservoir sands are present within the Heather, Tarbert and Ness Formations

- The intra Heather sandstone (2751m - 2769,5m log) is of Late - Middle Bathonian age, assigned to palynozone PJ5B

- The Upper Tarbert Formation (2806m - 2864,7m log) is of Early Bathonian - Late Bajocian age.

- The Middle Tarbert Formation (2864,7m - 2922,5m log) is of Late Bajocian - Early Bajocian age, assigned to palynozone PJ4D/E - PJ4C

- The Ness Formation (2922,51m - 3072m log) is of Early Bajocian - Aalenian age, assigned to palynozone PJ4C - PJ3D

Geochronological breakdown well 30/9-20S				
SAMPLE DEPTH m	PERIOD	AGE	Palyno Zone	Mikro Zone
425	LATE PLIOCENE			MNB5
475	LATE - EARLY PLIOCENE			MNP7
625	LATE MIOCENE			MN6B
825	MIDDLE MIOCENE		PT10	
		----UNCONFORMITY----		
875	EARLY MIOCENE		PT9B	
975	LATE OLIGOCENE		PT8	
1250	EARLY OLIGOCENE		PT7C	
1675	LATE EOCENE			MEB4
1700	MIDDLE EOCENE		PT5	
2000	EARLY EOCENE		PT3C	
2100	EARLIEST EOCENE		PT3A	
2175	LATE PALEOCENE	Thanetian	PT2C	
2275		Selandian	PT2A-4	
2360	EARLY PALEOCENE	Danian		MPP2
		----UNCONFORMITY----		
2370	LATE CRETACEOUS	Late Maastrichtian	PK9B	
2480		Early Maastrichtian		MK13B
2550		late Campanian	PK8C	
2580		Late - Middle Campanian		MK12A
2610		Early Campanian - Late Santonian	PK8B1	
2619		Middle - Early Santonian		MK10A
		----UNCONFORMITY----		
2628		Late Cenomanian		MK7C
2631		Middle - Early Cenomanian	PK6A	
2697	EARLY CRETACEOUS	late Albian	PK5C	
		----UNCONFORMITY----		
2739		? Aptian - ?Barremian	unassigned	
		----UNCONFORMITY----		
2750 (log)	LATE JURASSIC	(not dated)		
		----UNCONFORMITY----		
2751	MIDDLE JURASSIC	Late - Middle Bathonian	PJ5B	
2769		Early Bathonian - Late Bajocian	PJ5A	
2876.5 (SWC)		Late Bajocian	PJ4D/E	
2918.5 (SWC)		Early Bajocian	PJ4C	
		----UNCONFORMITY----		
3069		Aalenian	PJ3D	
		----UNCONFORMITY----		
3072	EARLY JURASSIC	Late- Middle Toarcian		MJ6 - MJ5
3124 TD				

Table 3.1: Geochronological breakdown 30/9-20 S

CHRONO- AND LITHOSTRATIGRAPHICAL BREAKDOWN, WELL 30/9-20S

GROUP	FORMATION	MEMBER	BED	DEPTH mMD RKB
Nordland				306
	Utsira			665
----------Stratigraphic Break----------				
Hordaland				843
	Grid			1579- 1613
Rogaland	Balder			2075
	Sele			2132
	Lista			2181
	Våle			2283
----------Stratigraphic Break----------				
Shetland	Hardråde			2360,5
	Kyrre			2588
----------Stratigraphic Break----------				
	Svarte			2629,5
Cromer Knoll	Rødby			2703
----------Stratigraphic Break----------				
	Åsgard			2 734
----------Stratigraphic Break----------				
Viking	Draupne			2750
----------Stratigraphic Break----------				
	Heather			2751
Brent	Upper Tarbert			2806
	Middle Tarbert			2864,7
	Ness			2922,5
----------Stratigraphic Break----------				
Dunlin				3 072

Table 3.2: Chrono- and lithostratigraphy

4 Litostratigraphy

All depths are in mMD RKB (RKB elevation is 24 m).

This summary is compiled predominantly from MWD log interpretation and ditch cuttings descriptions. A total of 2 conventional cores were cut in the interval from 2791 m to 2864 m in the well, see Table 5.1.1.

The well was drilled with returns to seabed from 125 m to 400 m before setting 20" casing at 398 m. The first drill cuttings samples were taken at 425 m. The lithology interpretation is based on MWD logs and cuttings descriptions.

4.1 Nordland Group 125 - 843m MD (125.0 - 842.3 m TVD)

125-400 m MD: From MWD logs: Clays interbedded with Sands.

400-665 m MD: From cuttings: Claystone with local sandlayers.

Sst: clr-trnsl Qtz, f-m, r crs, lse, sbang-rndd, pr sbrndd, wl-mod srt, Tr Mic, r Glauc, r shl frags

Clst: olv gry, m gry-dk gry, amor, sft, stky, calc, slty I.P., micromic, loc micropyr, carb

Age: Pleistocene / Pliocene / Miocene

<u>Utsira Formation 665-843 m MD (664.7-842.3 m TVD)</u>

665-843 m MD: From cuttings: Sandstone with minor Claystone layers

Sst: clr-trnsl Qtz, r smky Qtz, f-m, r crs, lse, sbang-sbrndd, wl-mod srt, sli calc, Tr Mic, loc sdy: wh-v lt gry, abd calc cmt.

Clst: olv gry, amor-sbblky, frm, sli calc, loc slty, Tr Mic, loc v sdy, Tr Glauc

Age: Miocene

4.2 Hordaland Group 843 - 2075 m MD (842.3 - 2048.8 m TVD)

Undifferentiated Hordaland 843 - 1579 m MD (842.3 - 1565.9 m TVD)

843-1579 m MD: From cuttings : Claystone and Sandstone with Limestone and Dolomite stringers

Clst: lt olv gry-olv gry-olv blk, brn gry, frm-sft, amor-sbblky, sl calc loc v calc, slty, vf sdy, Tr Glauc, Tr Mic, r Lign, loc micropyr, spg spic

Sst: v lt gry, clr-trnsl, r smky Qtz, f-m, r crs, sbang-sbrndd, mod-wl srt, gen lse Qtz, loc silic cmt, sl - non calc cmt, mnr arg mtrx, r-Tr Mic, r-tr Glauc.

Ls: v lt gry, pl yel or, hd, blky, microxln

Dol: dusky yel brn, hd, blky, brit, sl arg, micro-crypto xln

Age: Oligocene/Eocene

Grid Formation 1579 - 1613 m MD (1565.9 - 1598.9 m TVD)

1579-1613 m MD: From Cuttings : Sandstone, Claystone and Dolomite stringers

Sst: clr- trnsl-mlky Qtz, f-crs, pred f-m, r v crs, mod-pr srt, sbang- sbrnd, pred fri-lse, calc I.P., v silic cmtd I.P., loc tr Pyr cmt I.P, loc Pyr nod, r Glauc

Clst: olv gry-olv blk-brn gry, frm-mod hd, non calc loc sl calc, tr micromic, loc tr micropyr

Dol: pl yel or-dk yel brn, blky, hd, micro-crypto xln

Age: Eocene

Undifferentiated Hordaland 1613 - 1702 m MD (1598.9 - 1685 m TVD)

1613-1702 m MD: From Cuttings: Claystones with Traces of Dolomite

Clst: olv gry-olv blk-brn gry, trace dk grn gry-grn blk, frm-mod hd, blky, non calc, tr micromic, tr micropyr

Dol: pl yel or, blky, brit I.P., loc vf sdy, frm- hd-v hd, microxln

Age: Eocene

Green Clay 1702 - 2075 m MD (1685 - 2048.8 m TVD)

1702-2075 m MD: From Cuttings: Claystones and trace Dolomite and Limestone

Clst:	olv gry-olv blk, dk grn gry-grn blk-grn gry, loc lt grn gry, mnr olv blk, frm-mod hd, blky, non calc, tr micromic, loc tr micropyr, r carb mat, loc slty
Clst:	mod brn-gry rd-gry brn, mnr dk grn gry, m bl gry, olv gry, mod hd, blky, non calc, sl slty I.P., tr vf sdy
Dol:	pl yel or, dk yel brn, frm- hd-v hd, blky, calcareous, microxln
Ls:	wh-v lt gry, mod hd, blky, micro-cryptoxln, I.P. vf sdy

Age: Eocene

4.3 Rogaland Group 2075 - 2360.5 m MD (2048.8 - 2333.5 m TVD)

Balder Formation 2075 - 2132 m MD (2048.8 - 2105.1 m TVD)

2075-2132 m MD: Claystone and trace Tuff and Sand

Tf:	lt gry-m lt gry, frm-mod hd, mnr fri, sl stky I.P., tr vf sdy I.P., gen gd tr blk + trnsl glass shards, arg grdg tf Clst, non calc, tr - 10% lse Sd
Clst:	Varicoloured, grn gry-lt olv gry, lt brn gry, lt gry, m bl gry, frm-mod hd, occ stky, non-sl calc, mnr vf sdy, tr Tuff, r micropyr
Clst:	mnr olv blk-olv gry, mod hd, blky, non calc, abd dsm micropyr

Age: Eocene

Sele Formation 2132 - 2181 m MD (2105.1 - 2154 m TVD)

2132-2181 m MD: Claystone with minor Limestone

Clst:	olv blk-dk gry, mnr brn gry, mod hd, blky, non-sl calc, tr dsm micro pyr, sl carb
Ls:	wh-v lt gry, hd, blky, brit, micro-crs xln, mnr vf sdy

Age: Paleocene

Lista Formation 2181 - 2283 m MD (2154 - 2256 m TVD)

2181-2282 m MD: Claystone with minor Limestone

Clst: Varicol , dsky yel brn, m lt gry, m dk gry, r grn gry pred m gry, frm-mod hd, blky, non calc, tr micromic, r-tr micropyr, loc vf sdy, loc Tf ?
Ls: v lt gry, loc pl yel or, mod hd, blky, brit, microxln - xln, loc vf sdy, occ sl arg

Vaale Formation 2283 - 2360.5 m MD (2254.8 - 2333.5 m TVD)

2283-2360.5 m MD: Claystone grading Marl with minor Limestone

Clst: olv blk-olv gry, m dk gry- gry blk, loc m lt gry-m gry, frm-mod hd, sbblky, gen non-sl calc, loc v calc grdg Mrl, tr micromic, tr micropyr, r carb, r vf sdy
Ls: v lt gry-lt gry, mnr lt yel gry, frm-mod hd, blky-sbblky, microxln, arg, loc vf sdy, loc sl carb

Age: Paleocene

4.4 Shetland Group 2360.5 - 2703 m MD(2333.5- 2676 m TVD)

Undifferentiated Shetland 2360.5 - 2703 m MD (2331-2599 m TVD)

2360.5-2703 m MD: Claystones and Limestones

Clst: lt olv gry-olv blk, mod brn-brnsh blk, dk gry-gnsh gry-grysh blk, blky-sbblky, mod hd, sli slty, r blk spec, r micropyr, r micromic, mod calc.

Ls: pnksh gry-v lt gry, yelsh gry-rd wh, lt brn, blky, brit, mod hd-hd, blky, microxln - cryptoxln, non-v arg, r-tr Glauc

Age: Maastrichtian-Cenomanian

4.5 Cromer Knoll Group 2703 - 2750 m MD(2676 - 2722.9 m TVD)

Undifferentiated Cromer Knoll 2703 - 2750 m MD (2676 - 2722.9 m TVD)

2626-2747 m MD: Marl, Claystones and Trace of Limestones

Mrl: v lt gry – lt gry – lt olv gry, grd m dk gry, sbblky - blky, sft – fri, lse, fine lam, arg – grd calc Clst
Clst: m gry – m dk gry, gn gry, blky, frm, non calc
Ls: gry rd – pl rd brn – pl rd, mod hd – hd, blky, arg – v arg.

Ls: wh – v lt gry – yel gry – mnr pnk gry, mod hd – hd, brit, blky, tr Glauc, spks, Tr Clst: a.a.

Age: Barremian-Albian

4.6 Viking Group 2750 - 2751 m MD(2722.9 - 2723.9 m TVD)

Draupne Formation 2750 - 2751 m MD (2722.9-2723.9 m TVD)

2750 - 2751 m MD: The interval comprises of Claystones
Clst: blk, brit, blky, frm - mod hd, blk spec, Tr micropyr

4.7 Brent Group 2751 - 3072 m MD(2723.9 - 3044 m TVD)

Tarbert Formation 2751 - 2922.5 m MD (2723.9-2895.2 m TVD)

2751-2766 m MD: The interval comprises of Sandstones

Sst: dk gry - grysh blk, clr trnsl - mlky Qtz, vf - m, pred f, sbang - ang, arg - v arg, sli calc cmt I.P., r glauc, r mic, r blk spec, r pyr, fr vis por

Age: Bathonian

2766-2769 m MD: The interval comprises of Sandstones

Sst: dk gry - grysh blk, clr trnsl - mlky Qtz, vf - m, pred f, sbang - ang, arg - v arg, sli calc cmt I.P., r glauc, r mic, r blk spec, r pyr, vis por, No shows

Age: Bathonian

2769-2775 m MD: The interval comprises of Sandstones

Sst: dk gry - grysh blk, clr trnsl - mlky Qtz, vf - m, pred f, sbang - ang, arg - v arg, sli calc cmt I.P., r glauc, r mic, r blk spec, r pyr, vis por, oil shows

Age: Bajocian-Bathonian

2775-2781 m MD: The interval comprises of Sandstones

Sst: dk gry - grysh blk, clr trnsl - mlky Qtz, vf - m, pred f, sbang - ang, arg - v arg, sli calc cmt I.P., r glauc, r mic, r blk spec, r pyr, vis por

Age: Bajocian

2781-2791 m MD: The interval comprises of Sandstones

Sst: dk gry - grysh blk, clr trnsl - mlky Qtz, vf - m, pred f, sbang - ang, arg - v arg, sli calc cmt I.P., r glauc, r mic, r blk spec, r pyr, vis por, oil shows

Age: Bajocian

2791-2800 m MD: The interval comprises of Sandstones

Sst: olv gry-m gry-m dk gry, clr-trnsl-mlky Qtz, vf, wl srt, sbang, sli sil cmt, r-v calc cmt, r micropyr, r mic, r glauc, r carb mat, arg, no-pr vis por

Age: Bajocian

2800-2831 m MD: The interval comprises of Sandstones

Sst: dk gry-brn gry, m dk gry, v f-f, sbang, wl srt, sli sil cmt, Tr-v calc cmt, r mic, r carb, no-gd vis por

Age: Bajocian

2831-2856 m MD: The interval comprises of Sandstones

Sst: m lt gry - olv gry-brnsh gry, clr trnsl - mlky Qtz, sbang, v f-f, wl srt, sli sil cmt, occ sli arg, r-occ v calc cmt, r carb mat, r micropyr, r- occ v mic, r glauc, no-gd vis por

Age: Bajocian

2856-2864.5 m MD: The interval comprises of Sandstones

Sst: olv gry - brnsh gry, clr trnsl - mlky Qtz, sbang-sbrndd, vf-f, pred vf, wl srt, occ sli arg, sli-v calc cmt, sli sil cmt, r micropyr, Tr mic, r carb mat, r glauc, no vis por

Age: Bajocian

2864.5-2922.5 m MD: The interval comprises of Sandstones with minor Siltstones and Claystones

Sst: brn gry, clr trnsl Qtz, sbang, v f-crs, pred f, pr-mod srt, gen lse-fri, arg, carb, r micropyr, r micromic, non calc, pr vis por

Sltst: brn gry-olv gry-brn blk, mod hd-fri, non calc, arg, carb mat

Clst: brn blk-blk, frm-mod hd, blky, v carb grdg coaly

Age: Bajocian
Ness Formation 2922.5 - 3072 m MD (2895.2-3044.3 m TVD)

2922.5-2955 m MD: The interval comprises of Siltstones, Sandstones, Coal and minor Claystones

Sltst: lt gry-med lt gry-olv gry, frm, arg, mnr grad v f Sst, carb
Sst: lt olv gry-v lt gry, m lt gry, clr-trnsl Qtz, v f-crs, pred f-med, pr srt, sbang, mnr Kao Mtx, C frag, slty
C: gry blk, hd, blky, brit, mnr arg grdg coaly Clst
Clst: m dk gry-brn gr-olv gry, blky, frm-med hd, non calc, slty, lam

Age: Bajocian

2955-3012 m MD: The interval comprises of Claystones, Sandstones and Coal

Clst: lt olv gry-olv gry, lt brnsh gry-brnsh gry, r blk spec, blky, brit, sft-frm, non calc, lam
Sst: yel gry, r blk spec, clr trnsl Qtz, v f-crs, pred f, mod-pr srt, Kao cmt, n.v.p
C: gry blk, hd, blky, brit, mnr arg grdg coaly Clst

Age:Bajocian

3012-3072 m MD: The interval comprises of Claystones with minor Sandstones and with Coal beds

Clst: lt olv gry-olv gry, m gry-brnsh gry, r blk spec, blky, sft-frm, sli slty, non calc
Sst: yel gry, r blk spec, clr trnsl Qtz, v f-crs, pred f, mod-pr srt, Kao cmt, n.v.p
C: gry blk, hd, blky, brit, mnr arg grdg coaly Clst

Age:Bajocian

4.8 Dunlin Group 3072 m - 3124 m/TD MD (3044.3 - 3096 m/TD TVD)

3072-3124 m MD: The interval comprises of Claystones

Clst: olv blk-brnsh blk-blk, blky, brit, frm-mod hd, I.P. hd, non calc, r micropyr, sli slty, r sdy

Age: Toarcian

4.9 Hydrocarbon Shows

The evaluation of hydrocarbon shows at the wellsite was carried out in a conventional manner. A standard hydrocarbon total gas detector system(Geoservices Gaslogger) together with a gas chromatograph for automatic and continuous gas analysis, recorded as ppm by volume of C1 through nC5, were operational below 1287m down to TD of the well.

Hydrocarbon shows on ditch cuttings and cores were evaluated according to procedures described in Norsk Hydro's "Wellsite Geologist's Manual".

4.10 Gas Record

211 - 1287m: This interval was drilled with returns to sea bed.

1287 - 3124m: The gas record was made by the Reserval system providing C_1 to C_5 breakdown.

For gas chromatographic record in the well, see Lithology Log attached in Section C, and End of Well Report, Well 30/9-20 S, from Geoservices.

4.11 Oil stain and Fluorescence

A summary of the observed shows is given in Table 4.11.1 below.

INTERVAL (mRKB)	SOURCE	LITHOLOGY	SHOWS DESCRIPTION
2745	Core	Sandstones	No pet od, gd spty brn oil stn, ex uni brgt cream dir fluor, inst strmg(blmg) brgt blue - wh Fluor Cut, inst blmg mod straw vis Cut, ex brgt blue - wh even Fluor Res, fr yel even vis Res.
2748-2766	Core	Sandstones	No pet od, gd spty brn oil stn, ex uni brgt cream dir fluor, inst strmg(blmg) brgt blue - wh Fluor Cut, inst blmg mod straw vis Cut, ex brgt blue - wh even Fluor Res, fr yel even vis Res.
2769-2775	Core	Sandstones	No pet od, gd spty brn oil stn, ex uni brgt cream dir fluor, inst strmg(blmg) brgt blue - wh Fluor Cut, inst blmg mod straw vis Cut, ex brgt blue - wh even Fluor Res, fr yel even vis Res.
2781-2791	Core	Sandstones	No pet od, gd spty brn oil stn, ex uni brgt cream dir fluor, inst strmg(blmg) brgt blue - wh Fluor Cut, inst blmg mod straw vis Cut, ex brgt blue - wh even Fluor Res, fr yel even vis Res.
2747.5-2750	Sidewall cores	Sandstones	No pet od, no O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2753.5-2764	Sidewall cores	Sandstones	No pet od, no O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2772.5	Sidewall cores	Sandstones	No pet od, 30% mod brn O stn, no dir Fluor, v wk bl yel Fluor cut, no vis cut, spt brt bl wh Fluor res, no vis res
2787.5	Sidewall cores	Sandstones	No pet od, 20% spt lt brn O stn, no dir Flour, no Fluor cut, no vis cut, no Fluor res, no vis res
2790	Sidewall cores	Sandstones	No pet od, 20% spt lt brn O stn, v wk bl yel dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2875.3	Sidewall cores	Sandstones	No pet od, 20% spt lt brn O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2876.5	Sidewall cores	Sandstones	No pet od, no O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2887	Sidewall cores	Sandstones	No pet od, no O stn, 10% spt v wk yel wh dir Flour, no Fluor cut, no vis cut, spt bl wh Fluor res, no vis res
2918.5	Sidewall cores	Sandstones	No pet od, 20% spt v lt brn O stn, 20% v wk yel wh dir Flour, slw strmg yel v wk bl Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2939	Sidewall cores	Sandstones	No pet od, no O stn, 30% v wk yel wh dir Flour, no vis Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res
2745-2791	Cuttings		No pet od, gd spty brn oil stn, ex uni brgt cream dir fluor, inst strmg(blmg) brgt blue - wh Fluor Cut, inst blmg mod straw vis Cut, ex brgt blue - wh even Fluor Res, fr yel even vis Res

Table 4.11.1 Shows summary 30/9-20 S

5 Coring

5.1 Conventional Cores

A total of 2 cores were cut in the Tarbert Formation. The cores were cut and shipped in 1 m lengths. A summary of the cores is presented in Table 5.1.1 below, and the core description can be found in Appendix I.

No	C: Cut(m) R: Recovery(m)	Rec. %	Lithology	Formations
1	C: 2791-2827m R: 2791-2826.5	98.6	Sandstones	Tarbert Formation
2	C: 2826.5-2864m R: 2826.5-2863.65	99.0	Sandstones	Tarbert Formation

Table 5.1.1: Conventional Cores 30/9-20S

5.2 Sidewall Cores

A total of 27 sidewall cores were cut in the Draupne, Tarbert and Ness Formations. The cores were cut with a mechanical sidewall coring tool (MSCT). A summary of the sidewall cores is presented in Table 5.2.1 below, and the sidewall core descriptions can be found in Appendix II.

Core No.:	Depth (mRKB)	Lithology	5	Comments
1	2950.5	Sandstone		
2	2945.5	Sandstone	5	
3	2 943	Claystone	3.5	Crushed
4	2940.5	Siltstone	5	
5	2 939	Sandstone	5	
6	2925.5	Clayst.	0	Not recovered
7	2 922	Clayst.	5	
8	2918.5	Sandstone	5	
9	2905.2	Siltstone	5	
10	2902.5	Siltstone	5	
11	2898.2	Siltstone	5	
12	2 887	Sandstone	5	
13	2876.5	Sandstone	5	
14	2875.3	Sandstone	5	
15	2 790	Sandstone	5	
16	2787.5	Sandstone	5	
17	2 777	Sandstone	5	
18	2774.5	Sandstone	5	
19	2772.5	Sandstone	5	
20	2 772	Sandstone	5	
21	2 764	Sandstone	5	
22	2762.5	Sandstone	5	
23	2 756	Sandstone	5	
24	2753.5	Sandstone	5	
25	2750.5	Sandstone	5	
26	2748.5	Sandstone	5	
27	2747.5	Sandstone	5	

Table 5.2.1 Sidewall Cores 30/9-20 S

6 Logging

6.1 MWD Logs

A MWD service (Schlumberger Anadrill) yielding gamma ray, resistivity, density, neutron and survey measurements was run in the following sections:

Run no.	Log Depth Interval m RT	Hole section	Tool	Comments
1	125 - 188	36"	MWD Power Pulse - CDR	Directional only
2	198 - 484	9 7/8"	MWD Power Pulse - CDR	
3	198 - 400	26"	MWD Power Pulse - CDR	
4	398 - 630	20"	MWD Power Pulse - CDR	
5	398 - 630	20"	MWD Power Pulse - CDR	Directional only
6	630 - 1297	17 1/2"	MWD Power Pulse - CDR	
7	1297 - 1454	12 1/4"	MWD Power Pulse - CDR	
8	1454 - 1596	12 1/4"	MWD Power Pulse - CDR	
9	1596 - 2369	12 1/4"	MWD Power Pulse - CDR	
10	2369 - 2791	8 1/2"	MWD RAB - Vision - Power Pulse - ADN	
11	2791 - 3124	8 1/2"	MWD RAB - Vision - Power Pulse - ADN	Reamed cored interval 2791 - 2864 m

Table 6.1.1: MWD runs

More detailed MWD results can be found in the report "End of Well Report"/Logs, (Anadrill) Well 30/9-20S

6.2 Wireline Logs

The following table is a summary of wireline logs run in the well and shows run number, log type, date run and logged intervals for each log.

Run:	Logs:	Date:	Logged interval (mRKB)	Comments:
1A	AIT-IPLT	31-01-2002	3124-2362	
1A	GR-MSCT	31-01-2002	2975-2 747	27 cores cut, 26 recovered
1A	GR-VSP	01-02-2002	3124-2040	0 offset VSP
1A	GR-MDT	01-02-2002	2934.5-2746	Pressure points, oil and water sampling
1A	GR-DSI-OBMI	02-02-2002	3124-2000	2 passes in open hole

Table 6.2.1: Wireline logs 30/9-20S

6.3 MDT pressure points and sampling

A total of 37 pressure points were recorded. An overview of these is given in table 7.3.1. Sampling were performed at 2766.5m (Oil), 2807m (Oil) and 2868m (Water). See table 7.3.2 and 7.3.3 for details. Interpretation of MDT is given in chapter 7.3.

6.4 Velocity Surveys

Schlumberger acquired VSP data on 31st of January 2002. The survey ranged from 3119 m to 2039 m MD RKB. The spacing between levels was 15 m. The seismic source employed was a 3x150 cu.in. G-guns cluster at depth 4 m.

The VSP processing and the sonic calibration were performed by Read Well Services.
Figure 6.4.1 shows a corridor stack spliced in a surface seismic line through the well.

The weather condition during the survey was 15 to 20 knots wind and 2 to 3 m waves. The data quality is quite good.

For more information see the VSP contractor report,
Zero Offset VSP, 30/9-20-S
Document no. NH-00065892

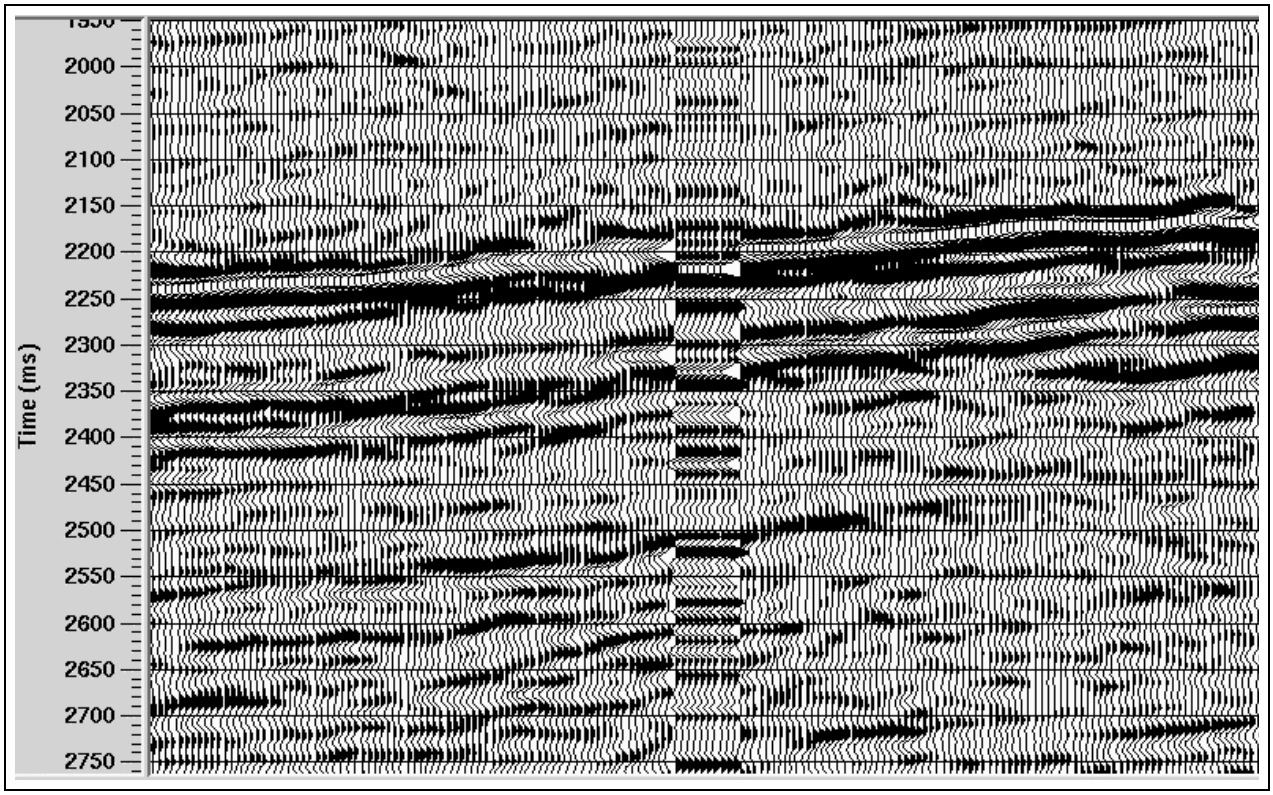


Figure 6.4.1: Corridor stack spliced in a surface seismic line through well 30/9-20 S

6.5 Bottom Hole Temperatures From Wireline Logs

The table below gives a summary of the bottom hole temperatures measured from wireline logs.

Log suite	Run	Depth (mRKB)	Temp ° C	Time since circ. (hrs)
AIT-IPLT	1A	3 124	100	11.25 hrs
GR-MSCT	1A	2 950	110	20.42 hrs
GR-VSP	1A	3 124	118	28.00 hrs
GR-MDT	1A	2934.5	110	38.75 hrs
GR-DSI-OBMI	1A	3 124	118	63.30 hrs

Table 6.5.1: Bottom Hole Temperatures 30/9-20 S

When entered into a Horner plot, this gives a static formation temperature estimate of 116.1° C at 3051 m.

7 Petrophysical Results

7.1 Log Data Acquisition and Quality

The 36" and 17½" hole sections of well 30/9-20S were drilled with seawater and the 12¼" and 8½" hole sections were drilled with Versavert oil-based drilling mud. LWD logging was performed in the 17½", 12¼" and 8½" hole sections, (Table 7.1.1). Openhole wireline logging was carried out in the 8½" section only (Table 7.1.2). The DSI was run up into the lower part of the cased hole 12¼" section. Both LWD and wireline logging were performed by Schlumberger. The well deviation over the reservoir section 2751–3072 m MD RKB is typically about 2 degrees.

7.1.1 LWD Logs

Table 7.1.1 summarises the LWD logs acquired in well 30/9-20S. Eleven LWD runs were performed in this well. The CDR tool was run in the 17½", and 12¼" hole sections and provided phase shift and attenuation resistivities along with a gamma ray log. The quality of these logs is generally good, though the phase shift resistivity is erratic over some intervals. There is very limited overlap of the logging runs above the 8.5" section and because the memory data for runs 7-9 were not taken from the memory and archived after each run, only a composite of the runs is available. This lack of overlap data between logging runs restricts quality control of log repeatability and depth validity .

In the 8½" hole section, phase shift and attenuation resistivities were measured at 5 different depths of investigation and two different frequencies by means of the VISION675 tool. In addition, the azimuthal density neutron tool (ADN) was used to measure formation bulk density, bulk density correction, and neutron porosity. Schlumberger environmentally corrected all LWD logs at the wellsite.

Run no.	Log Depth Interval (m MD RKB)	Hole section	Tool	Comments
1	125 - 188	36"	Power Pulse – CDR	Directional only
2	198 - 484	9 7/8"	Power Pulse – CDR	
3	198 - 400	26"	Power Pulse – CDR	Directional only
4	398 - 630	20"	Power Pulse – CDR	
5	398 - 630	20"	Power Pulse – CDR	Directional only
6	630 - 1297	17 ½"	Power Pulse – CDR	
7	1297 - 1454	12 ¼"	Power Pulse – CDR	Tool not dumped between runs, tool failure and bit trip.
8	1454 - 1596	12 ¼"	Power Pulse – CDR	
9	1596 - 2369	12 ¼"	Power Pulse – CDR	
10	2369 - 2791	8 ½"	Power Pulse – ARC- ADN	POOH for coring
11	2791 - 3124	8 ½"	Power Pulse – ARC- ADN	Reamed cored interval 2791 - 2864 m

Table 7.1.1: Summary of LWD logs run in 30/9-20S

7.1.2 Wireline Logs

The wireline logs run in well 30/9-20S are summarised in Table 7.1.2. These logs include the first logging for Norsk Hydro of Schlumberger's new oil based mud dipmeter imaging tool (OBMI).

The DSI was run in upper dipole, lower dipole and P&S modes. The DSI was run up into casing in order to evaluate cement quality (top good cement estimated at 2100m MD RKB). The MDT formation tester collected both pressure data and fluid samples. The acquired wireline data are generally of good quality.

Run no.	Log Depth Interval (m MD RKB)	Tool	Comments
1A	3124-2362	AIT-IPLT	
1A	2975-2747	GR-MSCT	27 cores cut, 26 recovered
1A	3124-2040	GR-VSP	0 offset VSP
1A	2934.5-2798.5	GR-MDT	Pressure points, oil and water sampling
1A	3124-2000	GR-DSI-OBMI	2 passes in open hole

Table 7.1.2: Wireline logs run in 30/9-20S

7.1.3 Composite Logs

Composite logs were generated by editing, depth shifting and merging of the individual logging runs. The components of the composite logs are summarised in Table 7.1.3.

Composite	17 ½"	12 ¼"	8 ½"	Comments
GR	GR_CDR	GR_CDR	GR_ADN	
RS	ATR_CDR	ATR_CDR	A34H_ADN	
RD	PSR_CDR	PSR_CDR	P34H_ADN	
RHOB			RHL_IPLT	Far detector density (tool pad became magnetised).
TNPH			APLC_IPLT	
DRHO			DRH_IPLT	
PEF			PEFL_IPLT	
DT		DTCO_DSI (in casing)	DT4P_DSI (openhole)	
DTSM			DTSM_DSI	
CALI			LCAL_IPLT	

Table 7.1.3: Overview of the composite log structure

7.2 Core Data Acquisition

Two cores were cut in well 30/9-20S as summarised in Table 7.2.1.

Core no.	Interval cored (m MD RKB)	Zone	Recovery (%)	Core depth shift (m MD)
1	2791.0 – 2827	T4A/T3	98.6	+3.0
2	2826.5 – 2864	T3	99.0	+3.0

Table 7.2.1: Cores cut in 30/9-20S

From these two cores, a total of 274 core plugs were selected for conventional core analysis, performed by Reslab (Core Analysis Report, Well 30/9-20S, Reslab). The program included measurements of:

- helium porosity
- Klinkenberg corrected horizontal and vertical air permeabilities
- grain density
- core spectral gamma ray

After drilling of the core plugs, core photographs of the B-cut of the core were taken using white light and UV-light, with each frame covering up to 5 metres of core,
(Ref. Core Analysis Report, Well 30/9-20S, Reslab).

Using the Recall software, the core gamma ray log was depth shifted to match the reference wireline gamma ray log (IPLT log). Both cores were shifted +3 m to depth match the core to the log data.

7.3 MDT Data Acquisition

The MDT toolstring was wireline conveyed and the WFT operations were conducted during one run.

7.3.1 MDT Pressure Data

Pressure data were taken at various depths over the complete reservoir interval and include data from the oil and water zones. In total, 36 drawdown pressure pretests were attempted of which 30 were successful. These generally featured low fluid mobility. The MDT run was depth correlated to the IPLT GR log. The pressure tests were performed with a standard probe. Both quartz gauge and strain gauge data were collected. The CQG pressure data are listed in Table 7.3.1 and shown in Figure 7.7.10 and Figure 7.7.12.

Test No.	Depth (m MD RKB)	Depth (m TVD MSL)	Mobility Quartz (md/cp)	Mud Pressure Initial Quartz (bar)	Mud Pressure Final Quartz (bar)	Formation Pressure Quartz (bar)	Pretest volume (cc)	Remarks
1	2934.5	2882.7	36.4	369.65	369.72	301.69	20.0	very good
2	2920.0	2868.3	5.2	369.77	369.85	300.68	4.1	
3	2916.0	2864.3	1.1	367.35	367.39	300.26	4.9	
4	2896.5	2844.8	1.1	365.04	365.10	298.07	4.9	
5	2894.0	2842.3	1.5	364.75	364.81	297.64	5.0	
6	2885.5	2833.3	9.2	363.69	363.77	296.06	20.0	very good
7	2873.5	2821.8	17.3	362.22	362.27	293.80	20.0	very good
8	2868.0	2816.3	20.8	361.51	361.58	292.99	20.0	very good
9	2860.0	2808.3	1.1	360.55	360.56	192.99		tight
10	2853.5	2801.9	3.8	359.66	359.72	291.43	20.0	very good
11	2846.0	2794.4	8.1	358.74	358.81	290.63	20.0	very good
12	2840.0	2788.4	6.6	357.99	358.07	290.08	20.0	very good
13	2835.5	2783.9	6.7	357.45	357.53	289.63	20.0	very good
14	2828.0	2776.4	7.2	356.55	356.61	288.85	20.0	very good
15	2820.0	2770.4	21.5	355.54	355.61	288.02	20.0	very good
16	2816.5	2764.9	41.2	355.13	355.19	287.73	20.0	very good
17	2814.0	2762.4	4.7	354.84	354.88	287.57	20.0	good
18	2811.5	2759.9	15.7	354.53	354.58	287.41	20.0	very good
19	2806.5	2754.9	103.7	353.88	353.95	287.05	20.0	very good
20	2801.0	2749.4	2.4	353.20	353.30	286.76	4.0	good
21	2798.5	2746.9	1.0	352.95	352.99	286.59	5.0	not good
22	2795.0	2743.4	2.6	352.50	352.56	286.33	20.0	good
23	2793.5	2741.9	0.7	352.35	352.36	283.75	2.7	tight
24	2793.0	2741.4	0.0	352.33	352.32	286.35	3.0	tight
25	2790.0	2738.4	0.7	351.90	351.94	286.31	3.0	tight
26	2788.0	2736.4	1.3	351.67	351.21	285.99	4.4	good
27	2786.0	2734.4	1.0	351.44	351.46	201.88		tight
28	2774.0	2722.4	4.8	349.82	349.94	166.82	2.5	tight
29	2769.0	2717.4	3.2	349.25	349.35	284.01	20.0	good
30	2766.5	2714.9	8.3	348.99	349.03	283.77	20.0	good
31	2763.5	2711.9	3.4	348.64	348.69	283.58	20.0	good
32	2761.0	2709.4	1.5	348.35	348.40	283.46	4.9	good
33	2757.5	2705.9	5.2	347.93	347.98	283.17	16.1	good
34	2756.0	2704.4	6.3	347.77	347.78	283.06	20.0	good
35	2753.0	2701.4	1.6	347.39	347.42	282.90	20.0	good
36	2746.5	2694.9	2.3	346.49	346.56	281.84	20.0	good

Table 7.3.1: MDT Quartz gauge pressure data

7.3.2 MDT Fluid Sampling

As the formations tested are consolidated and of relatively low permeability, the large diameter probe was used for all of the fluid sample operations. A total of 13 bottles were filled with reservoir fluid.

During the first sample operation at 2766.5 m MD RKB, the lower seal valve failed on the lowest MRMS-module (MRMS #3). Consequently the remaining 5 bottles in multi-bottle module #3 became unavailable for sampling purposes, so that no spare bottles were available on the tool. However, all the remaining bottles were successfully filled and the sampling program was completed.

Also the upper seal valve on the same MRMS-module (MRMS #3) failed during filling of the first bottle at 2807 m MD RKB. This did not prevent completion of the sampling operations, since the lower seal valve on MRMS #2 could be closed in order to fill the remaining bottles. A 14th bottle (MPSR 036) was used during the 'trouble shooting' of this valve failure. A summary of the sampling operations is given in Table 7.3.2.

Depth	Comments
2766.5m	3 x 250cc and 2 x 450cc bottles Max. drawdown 72 bar Total time 7:18 hrs, 147.4 litre 5 out of 5 captured
2807m	3 x 250cc, 1 x 450cc bottles Max. drawdown 6 bar Total time 3:15 hrs, 264.4 litre 4 out of 4 captured
2868m	***5 x 450cc bottles*** Max. drawdown 101 bar Total time 2:12 hrs, 79.5 litre 4 out of 5 captured

7.3.2: Summary of the MDT formation sampling jobs

The offshore fluid transfer was performed by OilphaseThe opening pressures were measured on all samples. The single phase multi-sample chambers (250cc SPMC) were heated to reservoir temperature at above reservoir pressure for a minimum of 1 hour before sample transfer to single phase sample bottles (SSB). All SSB were pressurised to ensure monophasic transportation and analysis of the samples. Three multi-phase sample retainers (450cc MPSR) that contained hydrocarbons were repressurised above reservoir pressure, agitated and heated to 80 ^{o}C for a minimum of six hours prior to transfer into Oilphase conventional sample bottles (CSB).

The four MPSR which contained formation water had very low opening pressures and were only pressurised above reservoir pressure and agitated before transfer into CSB's.

The transfer procedures are detailed further in Field Operation Report, Well 30/9-20S (Oilphase). The sample bottle conditions are summarised in Table 7.3.3.

MDT Bottle	Opening Pressure	Transfer Conditions	Transfer Bottle
Oil zone @ 2766.5m			
MPSR* 803	180bar @ 12 ^{0}C	620.5bar @ 80 ^{0}C	CSB*** 7077-MA
MPSR 773	180bar @ 12 ^{0}C	620.5bar @ 80 ^{0}C	CSB 7127-MA
SPMC** 135	510.2bar @ 12 ^{0}C	620.5bar @ 107 ^{0}C	SSB**** 9278-MA
SPMC 120	510.2bar @ 12 ^{0}C	620.5bar @ 107 ^{0}C	SSB 3904-MA
SPMC 150	510.2bar @ 12 ^{0}C	620.5bar @ 107 ^{0}C	SSB 9686-MA
Oil zone @ 2807m			
MPSR 771	180bar @ 12 ^{0}C	620.5bar @ 80 ^{0}C	CSB 7092-MA
SPMC 154	503.3bar @ 12 ^{0}C	620.5bar @ 108 ^{0}C	SSB 9280-MA
SPMC 136	499.9bar @ 12 ^{0}C	620.5bar @ 108 ^{0}C	SSB 9671-MA
SPMC 152	499.9bar @ 12 ^{0}C	620.5bar @ 107 ^{0}C	SSB 9684-MA
Water zone @ 2868m			
MPSR 800	atm. @ 12 ^{0}C	620.5bar @ 12 ^{0}C	CSB 7099-MA
MPSR 1006	atm. @ 12 ^{0}C	620.5bar @ 12 ^{0}C	CSB 7128-MA
MPSR 086	atm. @ 12 ^{0}C	620.5bar @ 12 ^{0}C	CSB 7078-MA
MPSR 643	atm. @ 12 ^{0}C	620.5bar @ 12 ^{0}C	CSB 7103-MA

Table 7.3.3: Overview of sample bottle transfer conditions

[i] Sample not monophasic at surface

***MPSR** - **MultiPhase Sample Retainer, Schlumberger 450cc MDT-bottle**
****SPMC** - **SinglePhase Multi sample Chamber, Oilphase 250cc MDT-bottle**
*****CSB** - **Conventional Sample Bottle, Oilphase (700cc)**
******SSB** - **Singlephase Sample Bottle, Oilphase (820cc)**

A small amount of sample from SPMC's 120 and 152 was removed for estimation of base oil contamination levels by using the C_{36}^+ method. The contamination level was found to be 4.9 wt-% and 3.2 wt-%, respectively. No other fluid analysis were performed offshore.

All the samples were shipped to the Oilphase base before they were sent to the Norsk Hydro fluid storage facility at ResLab in Stavanger.

7.4 Petrophysical Evaluation Method

Log interpretation has been performed using the Recall program and the values applied for various computational parameters are listed in Table 7.4.1. An effective porosity shaly sand model has been applied and water saturation has been calculated using the Indonesia equation. Coal and calcite cemented intervals have been identified by visual inspection of the logs and in these intervals, the porosity and water saturation values have been set to zero and one respectively. Vertical depths have been calculated from the survey data through application of the enhanced minimum curvature method.

The primary logs used for log interpretation are shown in Figure 7.7.1.

Parameter	Symbol	Value	Unit
Formation temperature (at 3070 m TVD MSL)	T	118	degC
Temperature gradient over reservoir interval	G_T	0.03	degC/m
GR sand	GR_{sand}	20 (2600-2725 m MD not used (2725- 3134 m MD)	GAPI
GR shale	GR_{sh}	80 (2600-2630 m MD) 75 (2630-2725 m MD) not used (2725- 3134 m MD)	GAPI
Shale density	ρ_{sh}	2.55	g/cc
Matrix density	ρ_{ma}	2.685	g/cc
Formation water density (290 bar, 112 degC)	ρ_w	0.990	g/cc
Invaded zone fluid density	ρ_{fl}	0.90	g/cc
Shale neutron porosity	$NPHI_{sh}$	0.34 (2725-3134 m MD)	fraction
Matrix neutron porosity	$NPHI_{ma}$	- 0.02	fraction
Formation water resistivity (at 24.6 degC)	R_w	0.169	ohm.m
Shale resistivity	R_{sh}	4.0	ohm.m
Archie constant	a	1	-
Archie m exponent	m	1.82	-
Archie n exponent	n	2.0	-

Table 7.4.1: Summary of petrophysical parameter values

7.4.1 Analysis of Core Data

A crossplot of core horizontal permeability vs porosity is shown in Figure 7.7.2. The data from zones T3 and T4A lie on different trend lines suggesting that the rock types associated with these two zones are slightly different. There are only 6 core plugs from zone T2_2E-G and these are more consistent with the T3 trend than the T4A. The permeability vs porosity relationships are consistent with the medium to low permeability Brent Formation sandstones.

A core vertical permeability versus horizontal permeability crossplot is shown in Figure 7.7.3. Below horizontal permeabilities of about 10 md there is wide dispersion in the data with no clear trend. Above horizontal permeabilities of about 10 md, a linear trend is apparent between log k_v and and log k_h which is almost a 1:1 relationship.

Distributions of the core grain density data are shown in Figure 7.7.4 and a plot of core permeability versus core grain density is shown in Figure 7.7.5. These plots show that the grain densities are typically in excess of 2.65 g/cc. The relatively high grain density values combined with relatively high GR log readings are most likely indicative of significant quantities of radioactive heavy minerals. A single grain density value of 2.685 g/cc has been used for porosity calculation purposes.

7.4.2 Porosity Determination

Shale volume was calculated using the linear gamma ray method in the interval above the reservoir, 2600-2725 m MD RKB. Significant quantities of mica, feldspar and radioactive heavy minerals occur within the reservoir interval resulting in a poor correlation between shale volume and GR log response. Consequently the GR log has not been used for shale volume determination over the interval 2725-3134 m MD RKB. In this interval, shale volume has been calculated using the standard density-neutron method only.

The total porosity was calculated from the IPLT density log without the use of ahydrocarbon correction. In the invaded zone sensed by the density log, hydrocarbons are a mixture of oiland oil based mud filtrate in the oil zone and oil based mud filtrate alone in the water zone. Amongst other things, the relative fractions of these fluids depend on the extent of invasion at the time of logging. As an approximation, a composite fluid density of 0.91 g/cc was used in both the oil and water columns. A single matrix density of 2.685 g/cc was used throughout. Using these parameters a good match between log derived total porosity and overburden corrected core porosity was achieved. Using a core porosity overburden correction factor of 0.97, the percentage difference between the log derived total porosity and the overburden corrected core porosity is less than 1% for both the oil zone (Figure 7.7.6) and the water zone (Figure 7.7.7).

Total porosity was calculated from the density log using the relationship:

$$\phi_t = \frac{\rho_{ma} - \rho_{log}}{\rho_{ma} - \rho_{fl}}$$

The effective porosity was calculated from the total porosity and the shale volume via the equation.

$$\phi_e = \phi_t - V_{sh..} (\rho_{dsh} - \rho_{sh}) / (\rho_{dsh} - \rho_w)$$

and
ϕ_e = effective porosity (fraction)
ρ_{sh} = shale density (g/cc)
ρ_{dsh} = dry shale grain density (2.68 g/cc)
V_{sh} = shale volume (fraction)

7.4.3 Water Saturation Determination

Water saturation has been calculated using the Indonesia (Poupon-Leveaux) shaly sand equation:

$$\frac{1}{R_t} = \left\{ \frac{\phi_e^{m/2}}{(a.R_w)^{0.5}} + \frac{V_{sh}^{(1 - Vsh/2)}}{R_{sh}^{(0.5)}} \right\}^2 . S_w^n$$

R_t was obtained from the AHT90 resistivity curve (2 foot vertical resolution, 90” depth of investigation) chosen from the set of 15 AIT resistivity curves. This set comprises the 90”, 60”, 30”, 20” and 10” depth of investigation induction resistivities at vertical resolutions of 1, 2 and 4 feet.

For the Tarbert Formation, a laboratory measured formation water resistivity, R_w = 0.0169 ohm.m at 24.6 degC has been used. The corresponding measured salinity is 42,750 mg/l of dissolved salts. Both these values were obtained via laboratory measurements conducted on an MDT water sample from this well.

The maximum temperature observed in the well is 118 degC at 3070 m TVD MSL. Using this maximum temperature value and an assumed temperature gradient of 3 degC/100 m TVD a temperature equation below was derived for use over the reservoir interval.

$$T\ (degC) = 0.03\ TVD\ MSL + 25.9$$

The Archie constant *a*, has been constrained to be equal to one. From preliminary results of SCAL studies a value of m=1.82 has been obtained for the Archie porosity exponent. The Archie saturation exponent n has been set to a value of 2.0.

CPI plots resulting from application of these methods and parameters are shown in Figures 7.7.8, 7.7.9 and 7.7.10.

7.4.4 Net Reservoir

In the Tarbert and Ness formations, net reservoir and net pay cutoff criteria have been defined using the effective porosity, shale volume and effective water saturation. The preferred cutoff limits in the Brent Group formations are 12% PHIE and 50% V_{sh} for net sand designation and 12% PHIE, 50% V_{sh} and 70% effective water saturation for net pay designation. Net pay has been set to zero below the free water level observed in the well at 2817.8 m MD RKB (2766.2 m TVD MSL).

Cutoff limits:
net sand: PHIE = 0.12, V_{sh} = 0.50
net pay: PHIE = 0.12, V_{sh} = 0.50, S_{we} = 0.70

These cutoff values have been chosen subjectively but taking into account
a core permeability cutoff of 1 md for net reservoir, the core permeability vs core porosity relationship (Figure 7.7.2) and the core permeability vs PHIE trend shown in Figure 7.7.11.

The corresponding zone averages of the Brent Group and Tarbert Formation petrophysical parameters are listed in Tables 7.4.2 and 7.4.3 respectively.

30/9-20S				NET SAND: cutoffs - BRENT PHIE > 0.12 VSH < 0.50					NET PAY: cutoffs PHIE as NET SAND SWE < 0.70				
ZONE	INTERVAL m RKB MD	GROSS m RKB MD	GROSS m TVD MSL	NET m RKB	NET m TVD	N/G (m RKB) fraction	PHIE fraction	SWE fraction	PAY m RKB	PAY m TVD	N/G (m RKB) fraction	PHIE fraction	SWE fraction
T4B	2751.0 - 2769.5	18.50	18.49	18.48	18.39	0.562	0.176	0.563	9.49	9.48	0.513	0.179	0.548
T4A	2769.5 - 2806.0	36.50	36.47	25.83	25.81	0.708	0.164	0.657	17.75	17.74	0.486	0.173	0.611
T3 OIL	2806.0 - 2817.8	11.80	11.79	9.82	9.81	0.832	0.205	0.489	9.33	9.33	0.791	0.205	0.476
T3 WATER	2817.8 - 2864.7	46.90	46.86	26.95	26.92	0.575	0.173	0.880	1.83	1.83	0.039	0.185	0.972
T2_2E-G	2864.7 - 2888.5	23.80	23.77	16.02	16	0.673	0.192	0.933	2.44	2.44	0.102	0.150	0.591
T2_2D	2888.5 - 2907.0	18.50	18.47	1.36	1.36	0.074	0.144	0.793	0.30	0.3	0.016	0.126	0.685
T2_2A	2907.0 - 2922.5	15.50	15.47	8.38	8.37	0.541	0.187	0.860	0.91	0.91	0.059	0.181	0.355
NESS	2922.5 - 3072.0	149.50	149.09	35.91	35.72	0.240	0.192	0.994	5.49	5.47	0.037	0.160	0.592
DRAKE	3072.0 - 3124.0	52.00	51.87	0.00	0.00	0.000	-	-	-	-	-	-	-
TOTAL	2751.0 - 3124.0	373.00	371.86	194.57	194.36	0.361	0.181	0.782	47.54	47.50	0.127	0.178	0.559

Table 7.4.2: Brent Group zone averages of petrophysical data

30/9-20S				NET SAND: cutoffs - BRENT PHIE > 0.12 VSH < 0.50					NET PAY: cutoffs, PHIE as NET SAND, SWE < 0.70				
ZONE	INTERVAL m RKB MD	GROSS m RKB MD	GROSS m TVD MSL	NET m RKB	NET m TVD	N/G (m RKB) fraction	PHIE fraction	SWE fraction	PAY m RKB	PAY m TVD	N/G (m RKB) fraction	PHIE fraction	SWE fraction
Z1	2751.0 - 2777.5	26.00	25.99	16.42	16.41	0.632	0.169	0.619	11.43	11.42	0.440	0.177	0.559
Z2	2777.5 - 2786.5	9.00	8.99	3.21	3.21	0.357	0.148	0.681	1.65	1.64	0.183	0.164	0.615
Z3	2786.5 - 2805.6	19.10	19.08	16.20	16.19	0.848	0.169	0.630	13.77	13.75	0.721	0.175	0.610
Z4-oil	2805.6 - 2817.8	12.20	12.19	10.22	10.21	0.838	0.203	0.496	9.73	9.73	0.798	0.203	0.480
Z4-water	2817.8 - 2821.6	3.80	3.80	3.80	3.8	1.000	0.181	0.929	-	-	-	-	-
Z5	2821.6 - 2851.6	30.00	29.97	13.39	13.38	0.446	0.176	0.853	-	-	-	-	-
Z6	2851.6 - 2861.6	10.00	9.99	8.62	8.61	0.862	0.169	0.894	-	-	-	-	-
Z7	2861.6 - 2864.6	3.00	3.00	1.13	1.13	0.377	0.140	0.938	-	-	-	-	-
Z8	2864.6 - 2890.6	26.00	25.97	16.15	16.13	0.621	0.181	0.832	-	-	-	-	-
Z9	2890.6 - 2907.7	17.10	17.07	1.22	1.22	0.071	0.146	0.799	-	-	-	-	-
Z10	2907.7 - 2926.7	19.00	18.96	8.53	8.52	0.449	0.198	0.849	-	-	-	-	-
TOTAL	2751.0 - 2926.7	175.20	175.00	98.89	98.81	0.564	0.177	0.737	36.58	36.54	0.209	0.183	0.556

Table 7.4.3

30/9-20S			NET SAND: cutoffs - BRENT PHIE > 0.12 VSH < 0.50				
ZONE	INTERVAL m RKB MD	GROSS m RKB MD	NET m RKB	cor porosity (fraction)	arithmetic permeability (md)	geometric permeability (md)	harmonic permeability (md)
T4B	2751.0 - 2769.5	18.50	10.40	-	-	-	-
T4A	2769.5 - 2806.0	36.50	25.83	0.185	15.60	6.60	4.05
T3 OIL	2806.0 - 2817.8	11.80	9.82	0.212	86.90	63.76	46.03
T3 WATER	2817.8 - 2864.7	46.90	26.95	0.175	16.77	9.91	1.12
T2_2E-G	2864.7 - 2888.5	23.80	16.02	0.114	0.27	0.26	0.25
T2_2D	2888.5 - 2907.0	18.50	1.36	-	-	-	-
T2_2A	2907.0 - 2922.5	15.50	0.38	-	-	-	-
NESS	2922.5 - 3072.0	149.50	85.81	-	-	-	-
DRAKE	3072.0 - 3124.0	52.00	0.00	-	-	-	-

Table 7.4.4: Brent Group zone averages of core permeability

7.5 Analysis of MDT Data

Fluid contact levels have been estimated taking into account MDT pressure data, log readings, PVT data from MDT samples and observations of core oil stains.

The MDT CQG pressure data and interpreted gradients are shown in Figure 7.7.12. From the pressure gradients two independent oil columns are apparent differing in pressure by about 0.5 bar. The upper and lower oil columns are separated in the well by a calcite cemented barrier at about 2796 m MD RKB. Both these oil columns occur within the Tarbert Formation. Some supercharging of the MDT pressure points is evident though this is mainly confined to the rocks associated with the lowest fluid mobilities as expected. Because of the scatter in the pressure data,

the pressure gradients cannot be resolved with great accuracy from the pressure data alone. Estimates of insitu oil densities from MDT oil sample analysis and insitu water density from MDT water sample analysis have been made. These data are summarised in Table 7.5.1. The pressure gradients corresponding to these measured densities have been imposed on the MDT pressure data to give the gradients and FWL's shown in Figure 7.7.10.

Formation	Sampling Depth (m MD RKB)	Fluid	Main PVT-properties			Comments
			GOR/GWR (Sm^3/Sm^3)	P_b (bar)	In-Situ Density (g/cc)	
Tarbert 4 B	2766.5	Oil	137.3	239.4	0.711	Upper oil
Tarbert 3	2807	Oil	126.4	224	0.705	Lower oil
Tarbert 2	2868	Water	1.15		0.990	

Table 7.5.1: Summary of MDT sample fluid analysis

From the intersection of the pressure gradients, the FWL of the lower oil column is calculated to be at 2766.2 mTVD MSL (2917.8 m MD RKB). The oil gradient used is 0.0698 bar/m corresponding to an insitu oil density of 0.711 g/cc.

The upper oil column has an 'oil down to' level corresponding to the top of the calcitic barrier at about 2744.5 m TVD MSL (2796 m RKB). Assuming that both oil columns have the same aquifer, then the FWL of the upper oil column is found to be at 2748.4 m TVD MSL (2800.0 m MD RKB). The applied upper oil column pressure gradient is 0.0692 bar/m corresponding to an insitu density of 0.705 g/cc.

Laboratory measurements of insitu water density give a density of about 0.99 g/cc at 110 degC and 288 bar. The corresponding pressure gradient is 0.0972 bar/m.

The CQG pressure gradient equations applied to determine the FWL's are (m TVD MSL).

lower oil column: $P_{oil1} = 0.0698.\,TVD + 94.760$
upper oil column: $P_{oil2} = 0.0692.\,TVD + 95.920$
aquifer: $P_{wat} = 0.0972.\,TVD + 18.965$

The FWL for the lower oil column at 2917.8 m MD RKB is consistent with the OWC indications from resistivity log responses and the oil staining on the core. From these data it is concluded that any difference between the FWL and the OWC cannot be reliably resolved and that for practical purposes they can be considered to be at the same level.

7.6 Discussion of Results

Two oil columns in the Tarbert Formation are encountered in this well. The oil reservoirs are generally of poor to medium quality with net sand permeabilities typically in the range 1–100 md. The GR and density-neutron log responses over the reservoir interval are indicative of the presence of significant quantities of mica and heavy minerals. The relatively low to medium core permeability values indicate that some of these minerals are probably pore filling.

The log derived porosity is a good fit to the measured core porosity and in the Tarbert oil reservoirs the average effective porosity is about 18%.

Log derived water saturations are high and are typically 40-70% in the net sand above the OWC. In order to check the validity of the log derived saturations a J-function saturation model has been derived from SCAL drainage capillary pressure data. A comparison of J-function derived and log derived saturations for the lower oil column are shown in Figure 7.7.13. The J-function derived S_w is generally less than the log derived S_w though the difference between the two decreases with height so that from about 15 m above the FWL the two saturations match well. The J-function derived saturation model is based on drainage capillary pressure data and the difference between the log and J-function derived saturations in the vicinity of the FWL may be indicative of an insitu imbibition environment.

The conclusion drawn from this comparison of saturation data is that J-function derived S_w values are even greater than the log derived S_w values near the OWC so that the high S_w values obtained from log analysis are not exaggerated and are probably representative. Consequently it is concluded that the high S_w values reflect the relatively low permeability and limited height above the FWL associated with such values. The net pay cutoff limit of S_w =70% has been chosen taking into account uncertainties in the log derived saturations.

7.7 Figures

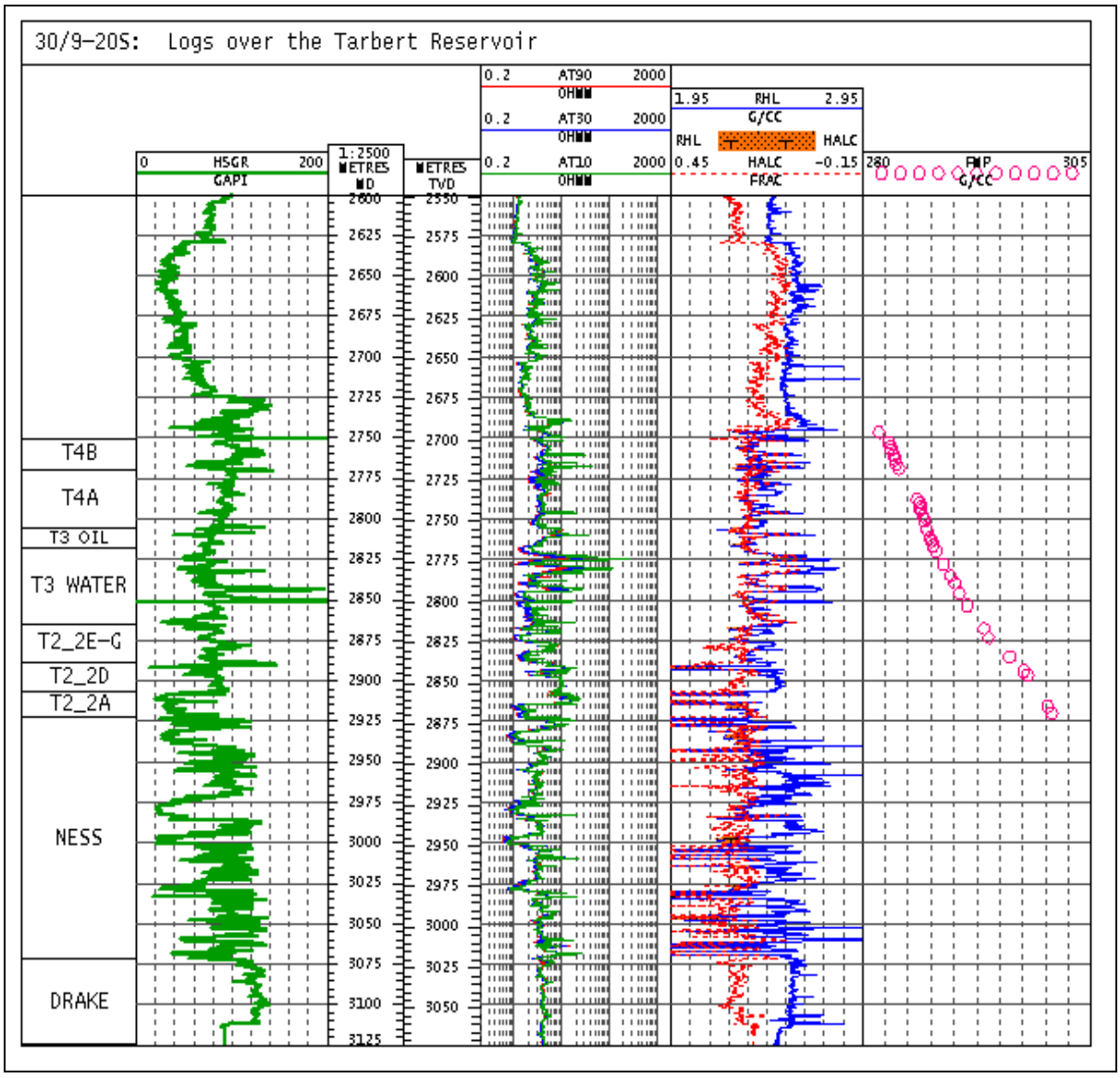


Fig. 7.7.1 Primary Logs over the Tarbert Formation

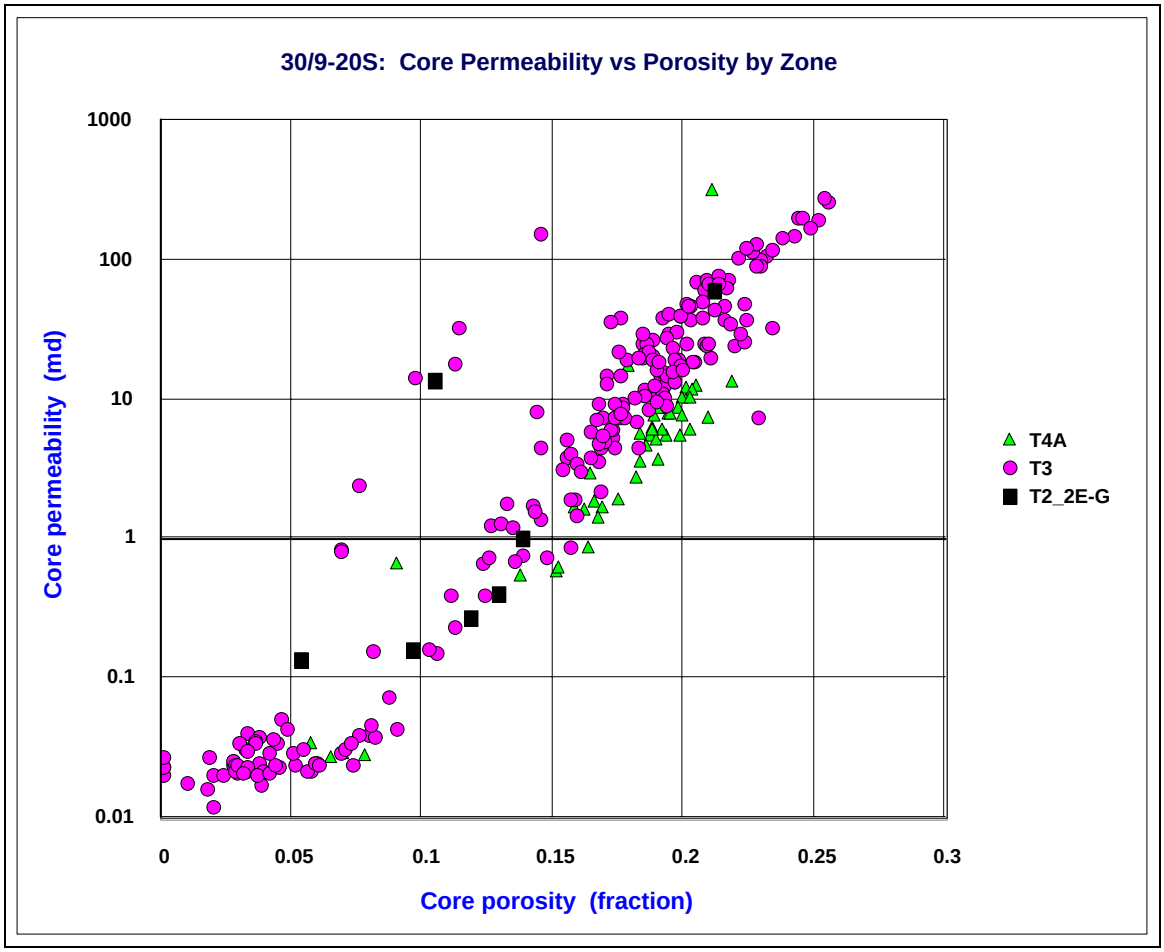


Fig. 7.7.2 Horizontal Core Permeability vs Core Porosity

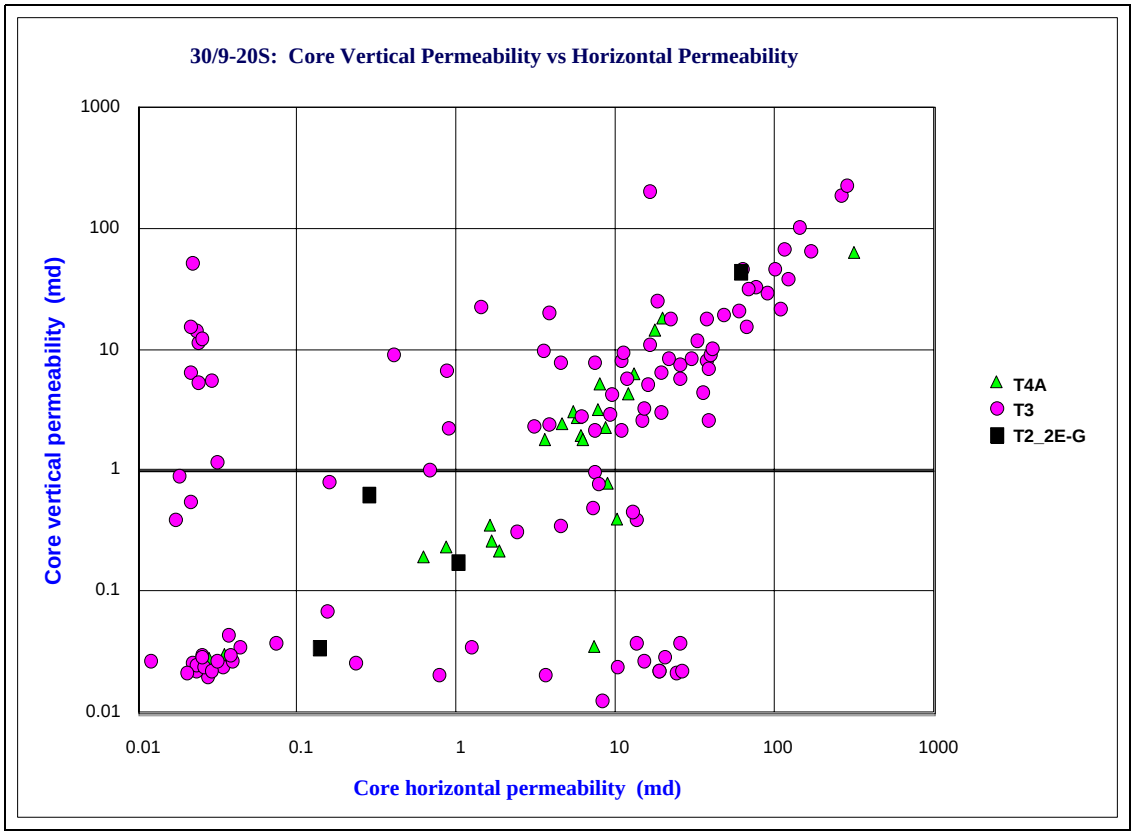


Fig. 7.7.3 Core Vertical Permeability vs Horizontal Permeability

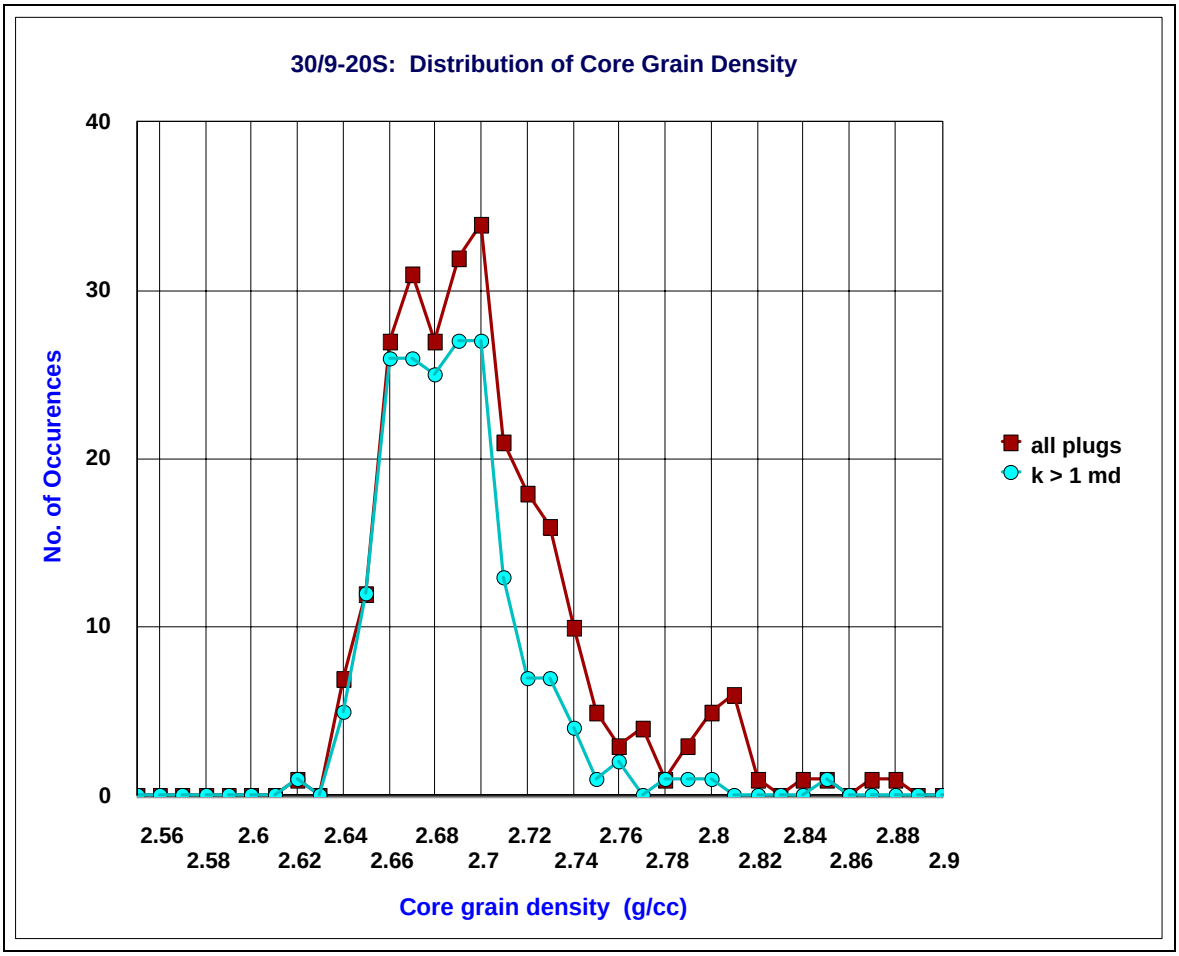


Fig. 7.7.4 Distributions of Core Grain Density

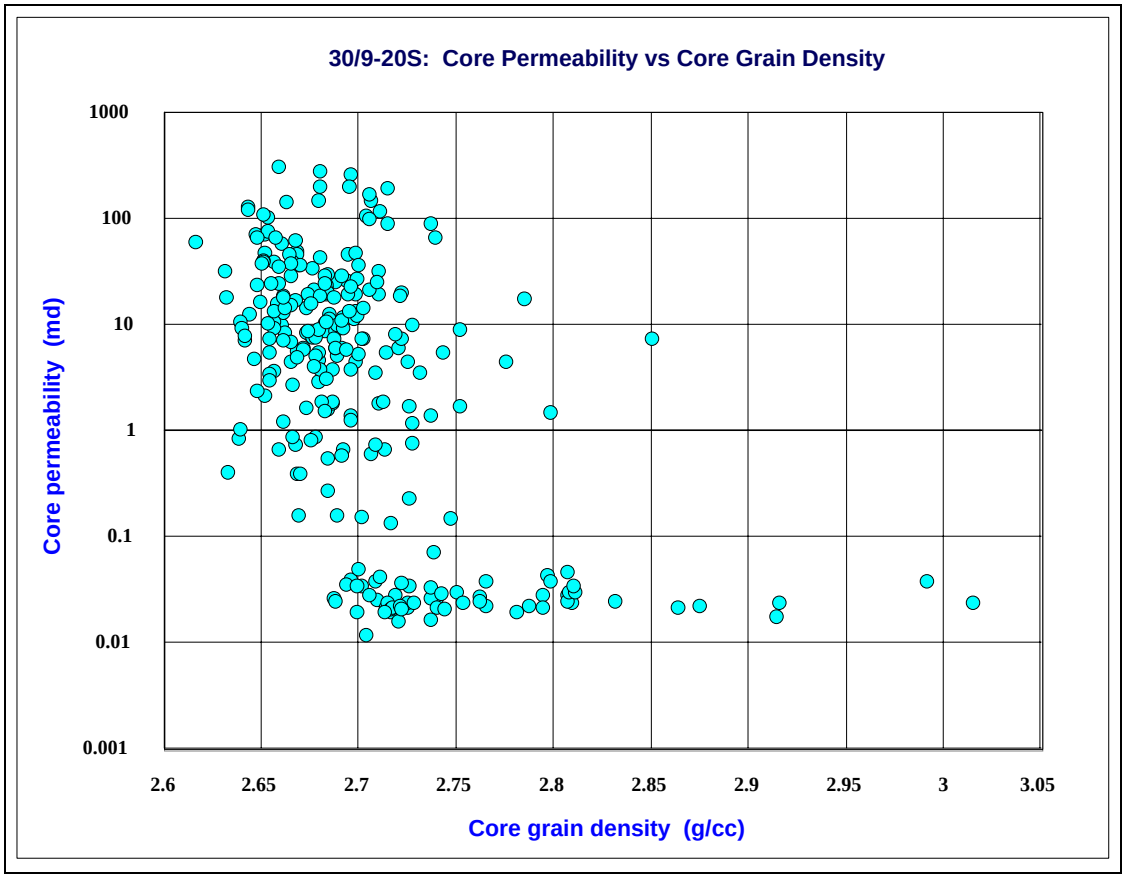


Fig. 7.7.5 Core Horizontal Permeability vs Core Grain Density

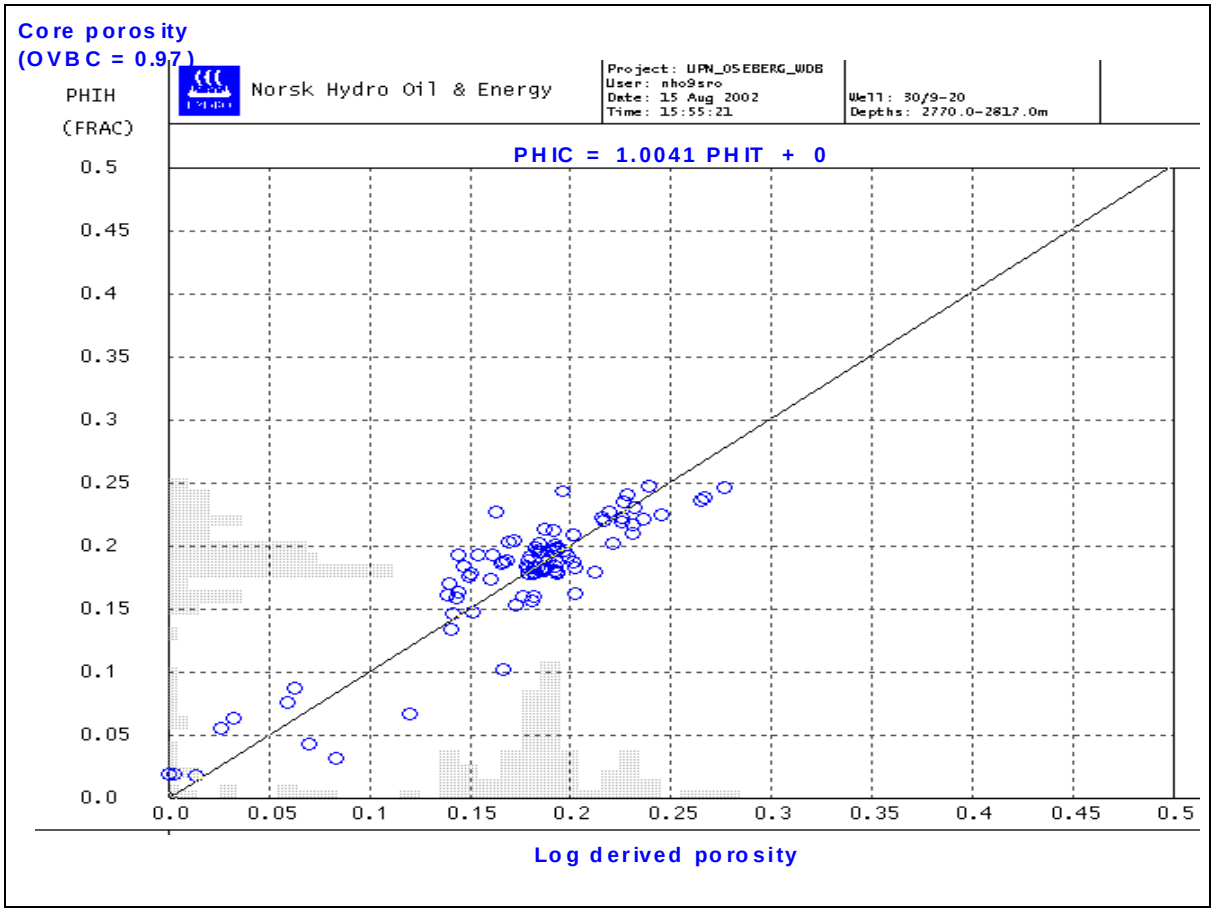


Fig. 7.7.6 Correlation betweenOverburden Corrected Core Porosity and Log Derived Total Porosity (oil zone)

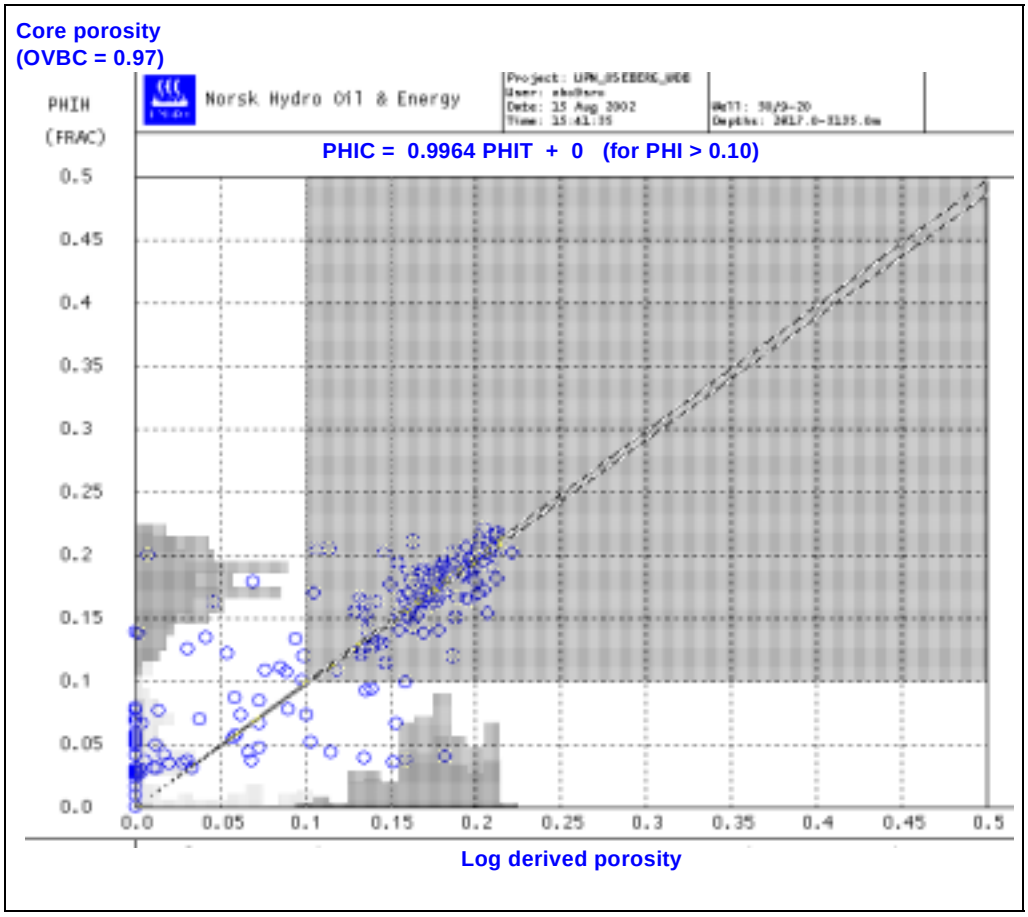


Fig. 7.7.7 Correlation betweenOverburden Corrected Core Porosity and Log Derived Total Porosity (water zone)

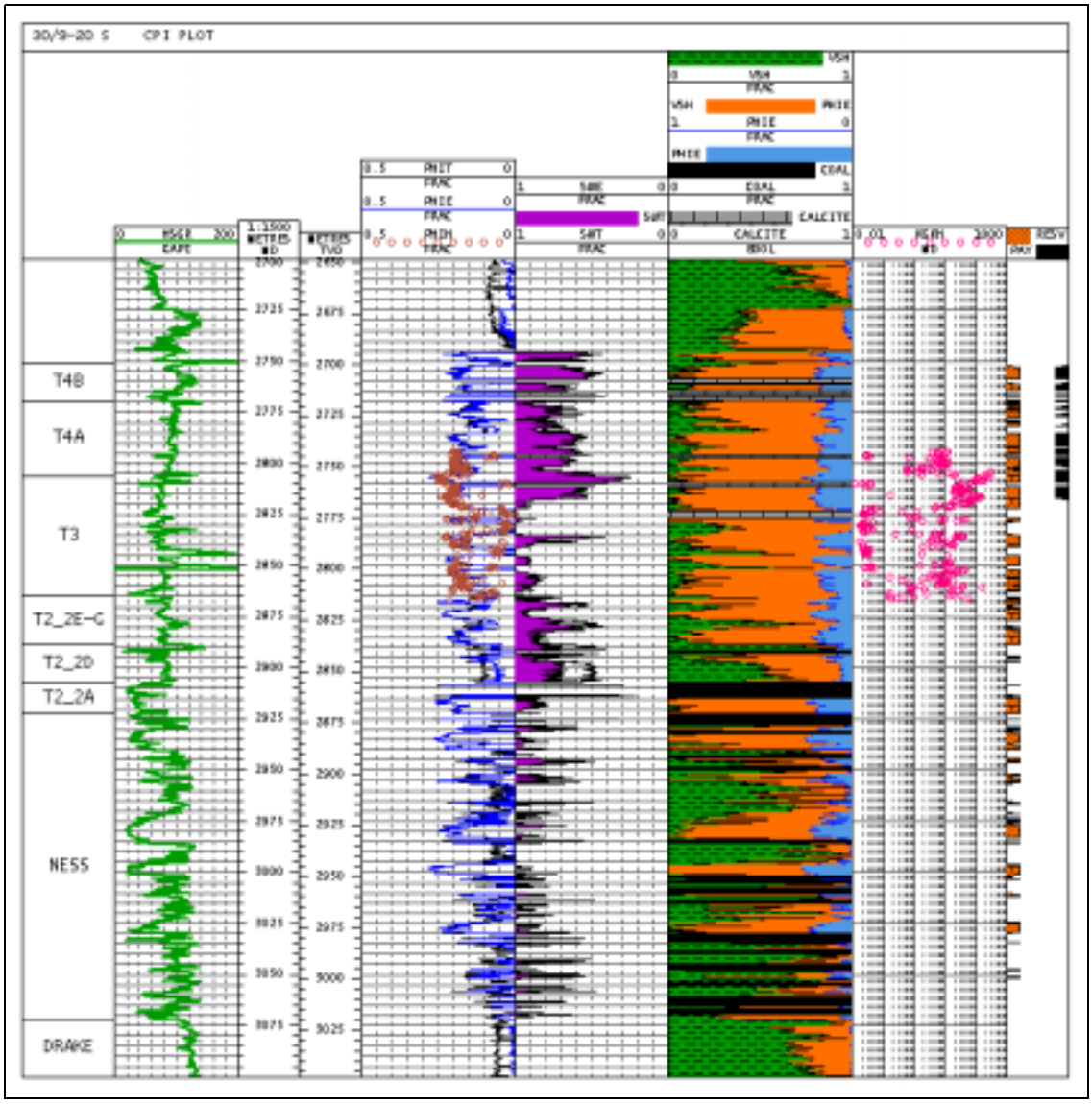


Fig. 7.7.8 CPI Plot 2700-3100 m MD RKB

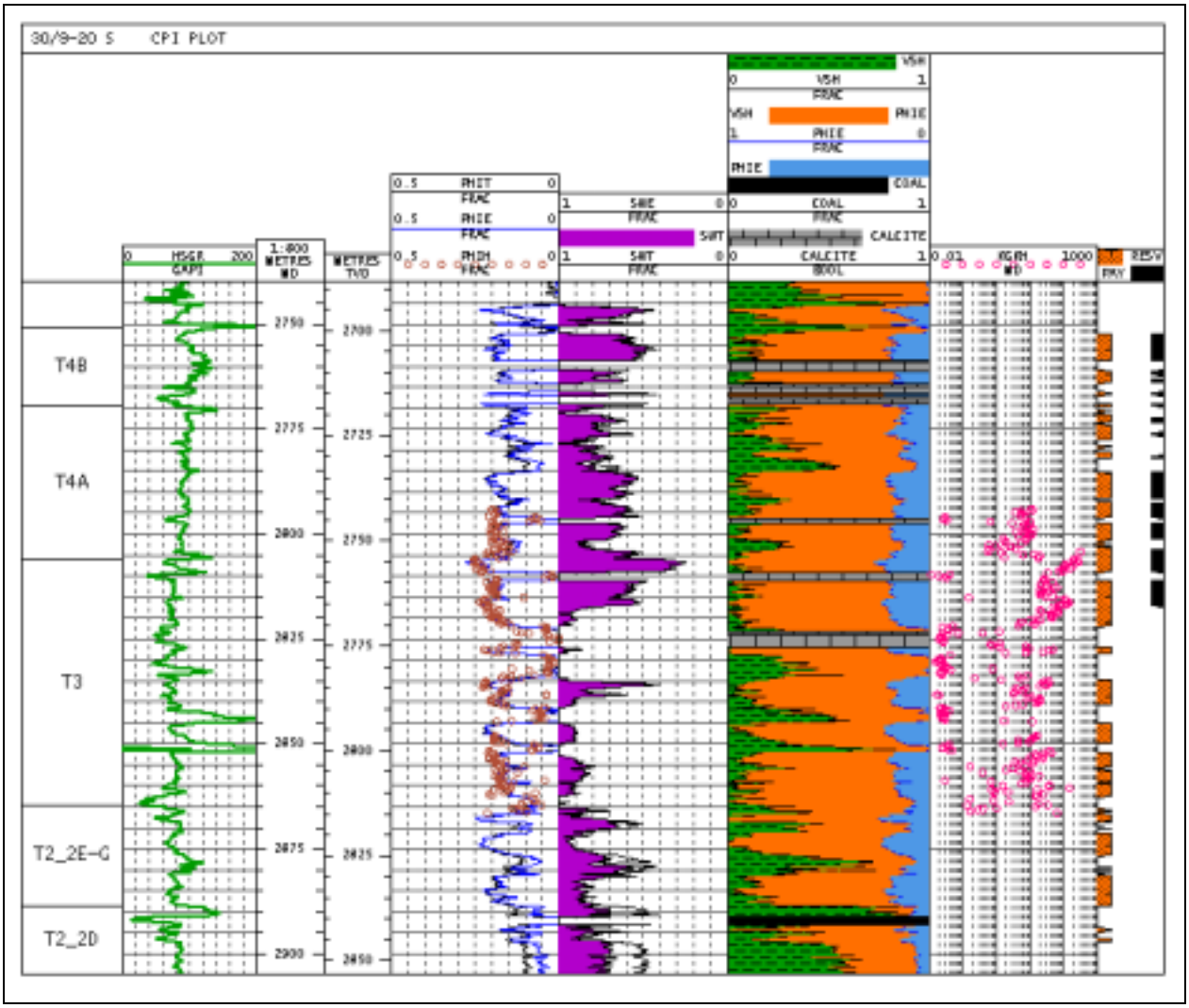


Fig. 7.7.9 CPI Plot 2740-2905 m MD RKB

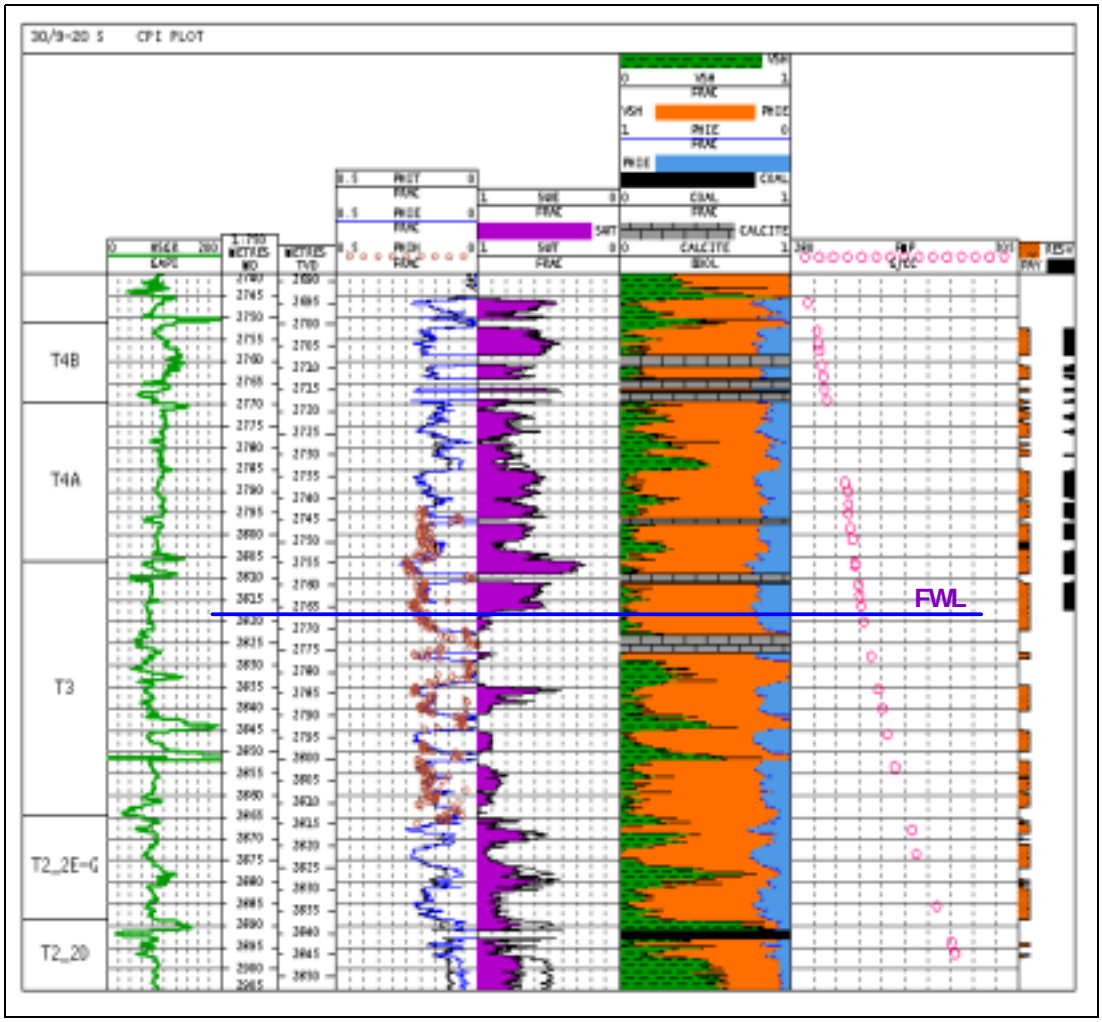


Fig. 7.7.10 CPI Plot 2740-2905 m MD RKB with Pressure Data

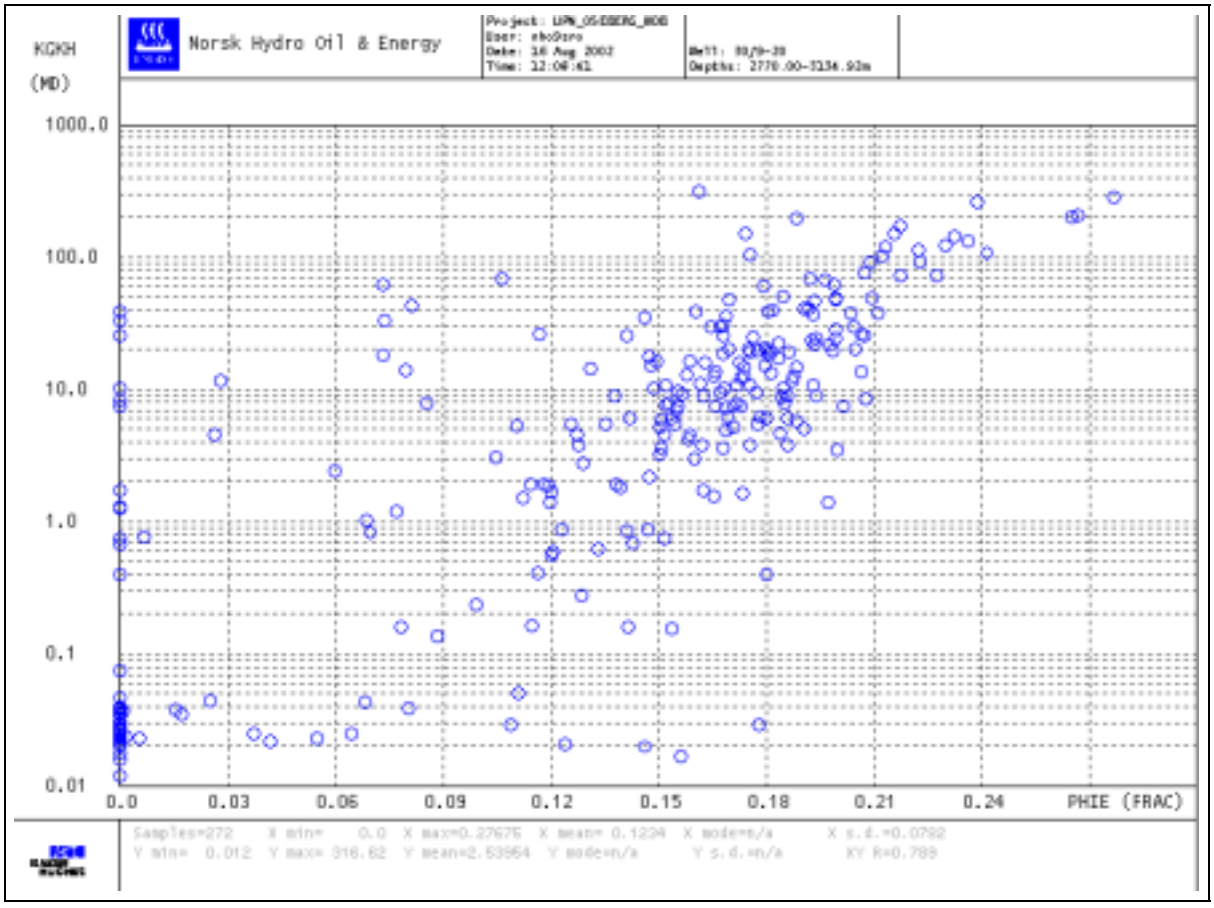


Fig. 7.7.11 Core Permeability vs Log Derived Effective Porosity

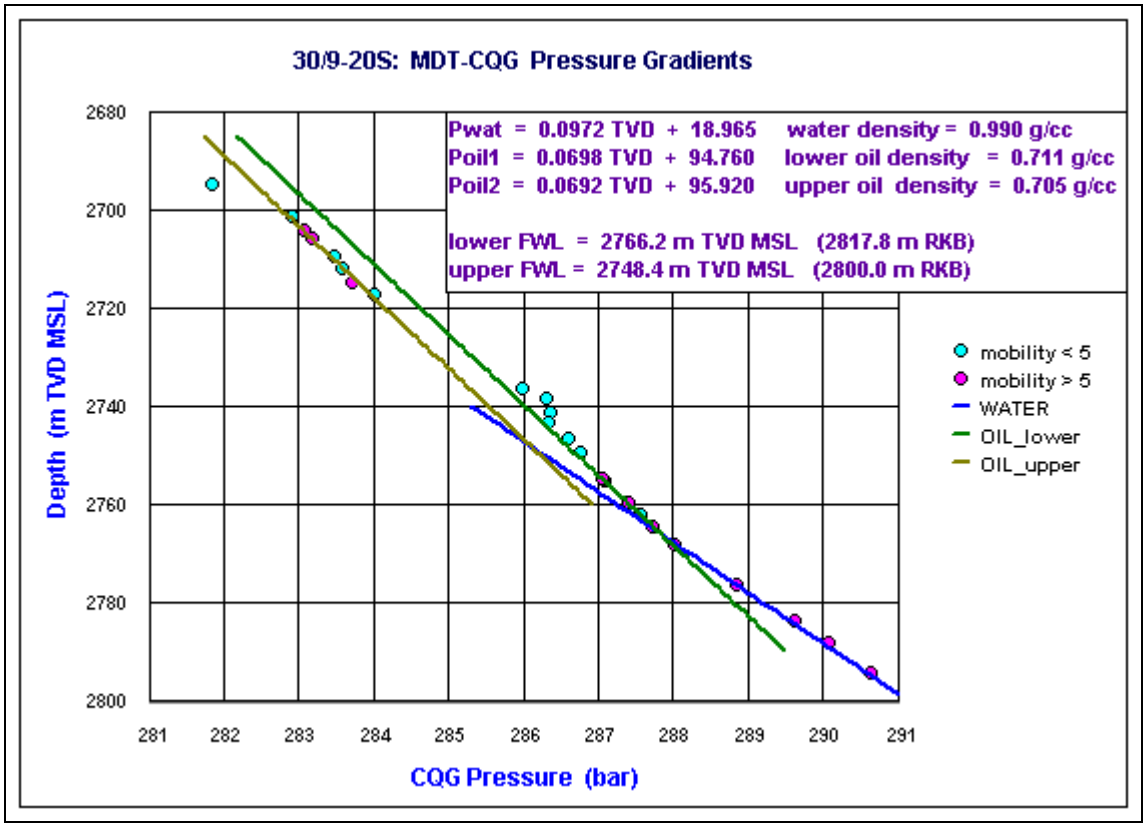


Fig. 7.7.12 MDT Pressure and Interpreted Gradients

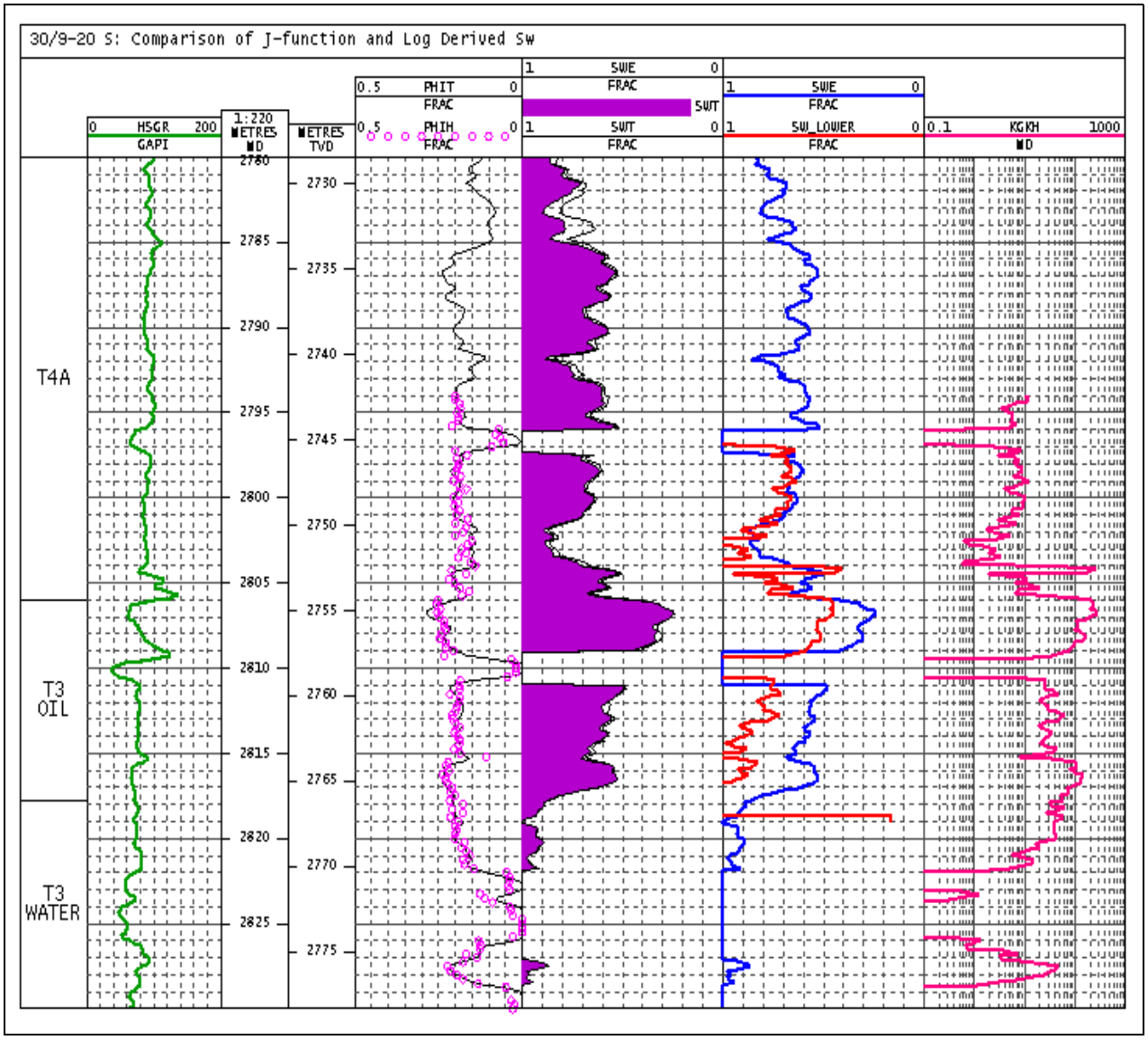


Fig. 7.7.13 Comparison of J-function Derived Sw and Log Derived Swe

8 Estimated Pore Pressure, Fracture, Overburden and Temperature Gradients

8.1 Pore Pressure

The pore pressures in well 30/9-20 S are based on well site observations, gas data, MDT pressure readings and calculations based on logs (MWD and Dxc).
The pore pressure-, fracture- and overburden gradients are given in figure 8.1

Shallow gas was registrated in the upper sediments at 460m MD RKB (435m MD MSL and 335m MD BSF) while drilling pilot hole. The well was displaced to 1.20sg mud after flow was observed. This should hold back a pressure of 1,16sg MSL (Mean Sea Level) (49,6bar). The well continued to flow and the hole was displaced to 1,50sg mud. This would hold back a pressure of 1,39sg MSL (59,5bar). The well was static after displacement to 1,50sg. While POOH the well started to flow again and the well was displaced to 1,60sg mud (= 1,39sg RKB and 1,47sg MSL). The well remained than stable for the rest of the operation. After opening the hole a 20" casing was set. The gas filled sand was now drilled using 1,30sg mud (58,7bar) and the hole was stable. This indicates that the pore pressure of the gas filled sand was in the order of or greater than 1,16sg MSL and less than 1,37sg MSL. Since the well started to flow easily with 1,50sg in the hole while POOH one could interpretate the pressure to be closer to 1,37sg MSL than 1,16sg MSL, but an intermittent value of 1,25sg has been chosen for the presentation. A pore pressure of 1,25sg demands the support of a 19m gas column if the weigth of the gas is 0,4 g/cc using the equation $P_o = (p_w - p_{hc}) \times 0{,}0981 \times h_{hc}$.
For the remaining of the well the pore pressure appears to be similar to the prognosis above the reservoir and the prognosed pressure of the reservoir was confirmed by the MDT pressure points.

8.2 Formation strength

The high mudweights used to kill the shallow gas flow (up to 1,39sg relative to RKB), without mudlosses, supports a high fracture gradient in the shallow sediments. This is probably due to glacial overcompaction.
One LOT was performed at 1296m to 1,67sg, within the range of other LOT's taken in the area.
Two FIT's was performed to 1.50sg at 402m and to 1,60sg at 2345m.

8.3 Overburden gradient

Overburden gradient is based on calculated values and the density log.

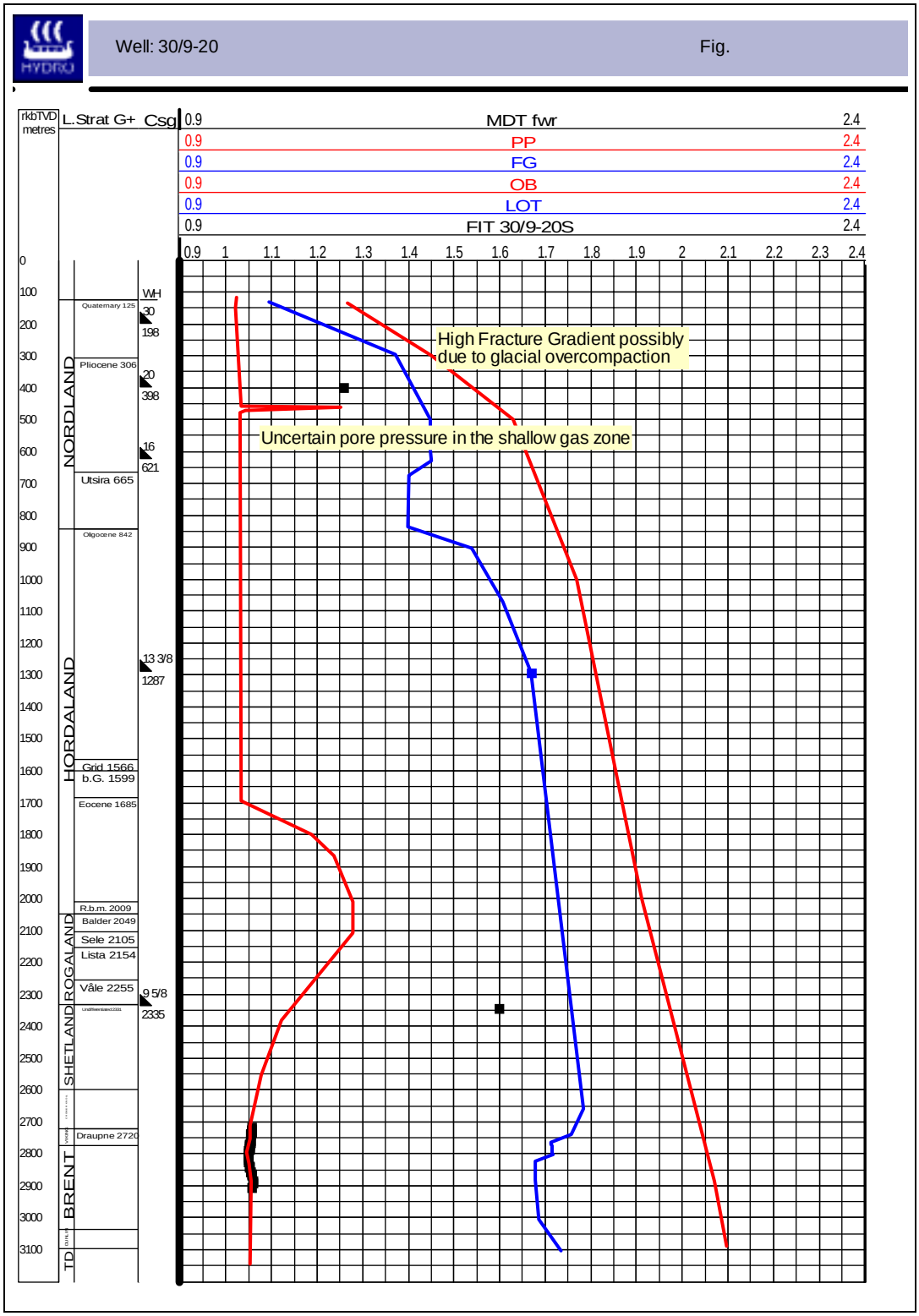


Figure 8.1: Porepressure, Fracture- and Overburden gradients

8.4 Temperature Gradient

MDT-readings at 3051 m gives a temperature of 116,1°C calculated, using Horner plot. This gives an average formation temperature gradient of 3,87° C/ 100m assuming 4°C at seafloor. This is lower than expected and may be caused by inaccuracy when calculating the Horner plot or by lateral variation in the temperature flow across the Oseberg area. The formation temperature gradient is given in figure 8.2.

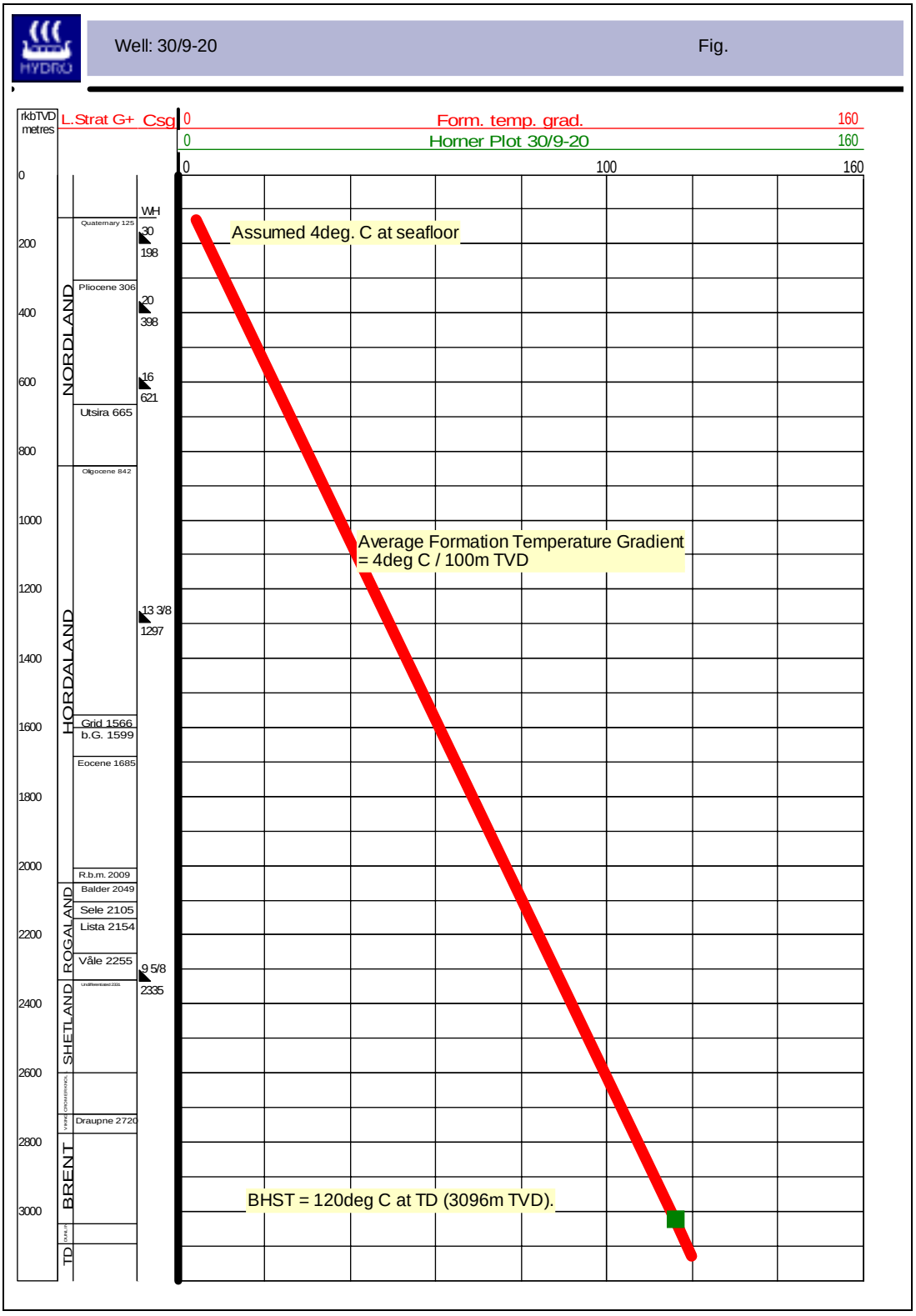


Figure 8.2: Temperature gradient

9 Geophysical Results

Prognosed and actual time/depth values in well 30/9-20S are listed in Figure 9.1.

The prognosed depths were encountered within the given uncertainties, except for Base Cretaceous and Middle Tarbert. A relatively high deviation from prognosed depth for the Top and Base Grid was expected, because Grid is not associated with any seismic event and is thus difficult to pick.

Base Cretaceous came in deeper than expected, due to a slight misinterpretation of the poor quality seismic data at this level. Base Cretaceous was not associated with any seismic reflections. Heather was thinner than expected and likely eroded. A very thin Draupne Shale was below seismic resolution.

All Tarbert reservoir units came in deeper than expected. This was partly due to depth conversion with lower velocities than expected from nearby wells, and partly due to seismic interpretation. The only good reservoir reflection in R is Near-Top-Ness. By correlation to nearby wells, this reflection was expected to very close to Top-Ness. The reflection turned however out to be an Intra Middle Tarbert reflection, so that all reservoir units was slightly deeper on the seismic than expected.

In addition, the thickness of Tarbert (Tarb1&2) was slightly overestimated, adding to the total of 78 m deeper than expected for Top Tarbert 2.

Top Dunlin came in shallower than expected, and the ORE formations were missing, probably due to fault cut-out. A thinner Ness may in the same way be explained by drilling into a fault zone. The dip-meter log supports the interpretation of Dunlin belonging to a local footwall segment, although this is not conclusive. A fault with approximate offset of 50-80 m is not easily seen on the seismic (Fig. 9.2), and its presence is still questionable.

	Prognosed	Uncert.	Actual	Delta	Prognosed	Actual	Delta
Horizon	Top mTVD MSL	+/- m	Top mTVD MSL	m	Top ms TWT	Top ms TWT	ms
B.Pleistocene	269		282	13			
T.Utsira	638	10	641	3			
T.Grid	1475	100	1542	67			
B.Grid	1505	100	1575	70			
Balder	2006	50	2025	19			
Sele	2063	70	2081	18			
Lista	2118	70	2130	12			
Shetland Gp.	2291	60	2310	19	2200	2209	9
Cromer Knoll	2559	60	2652	93			
BCU/Draupne	2614	40	2699	85	2378	2435	57
Tarb4 (Lower Heather)	2690	50	2700	10			
Tarb3 (Upper Tarbert)	2708	50	2754	46	2437	2464	28
Tarb2 (Middle Tarbert)	2736	50	2814	78			
Ness	2829	50	2871	42	2512	2531	19
Dunlin	3059	70	3020	-39	2643	2591	-52

Table 9.1: Geophysical Summary

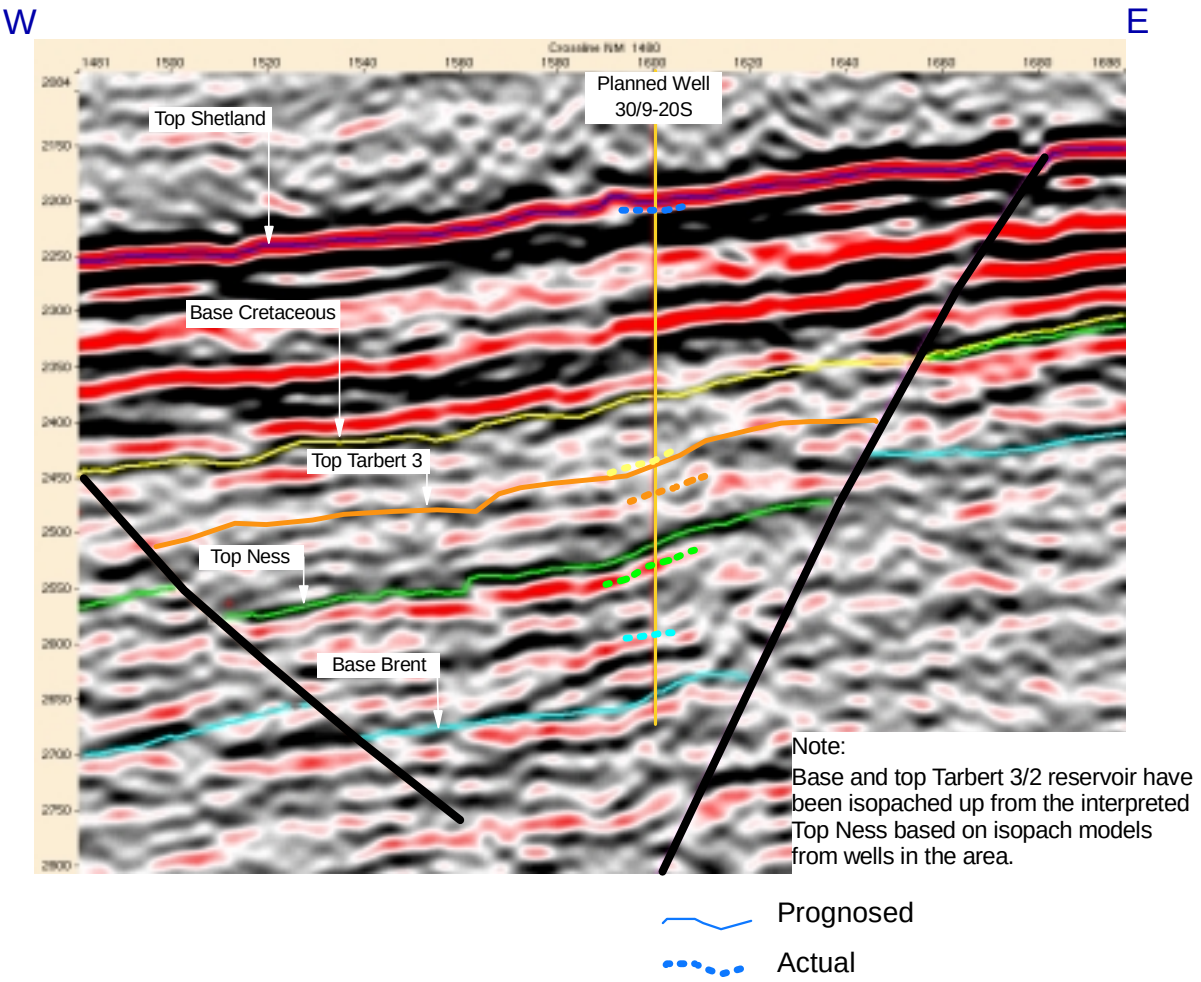


Figure 9.1. Seismic section through 30/9-20 S

10 Post Site Survey Report

The results are based on:

- 2D high resolution reflection seismic (NH9356)
- 3D reflection seismic (NH9802)
- MWD logs (resistivity and gamma)
- Drilling results from exploration and production wells (30/8-1S, 30/9-13S, 30/9-17, 30/9-18, 30/9-19 and 30/9-20)
- Site Survey at Location 30/9-17, 30/9-18, 30/9-19 and 30/9-20 S.

10.1 Well data

1	Distance from rig floor to sea level:	24.0 m
2	Water depth (MSL):	101 m
3a	Setting depth for conductor (m RKB):	198 m
3b	Leak Off / Formation Integrity Test (g/cc):	N/A
4a	Setting depth (m RKB TVD) for casing on which BOP mounted:	397,7 m
4b	Formation Integrity Test (g/cc):	1,26

5 Depth (m RKB TVD & Two Way Time) to formation/section/layer tops:

Base Pleistocene:	306 m	(310 ms)
Intra Pliocene 1	362 m	(358 ms)
Intra Pliocene 2	490 m	(498 ms)
Intra Pliocene 2b	588 m	(570 ms)
Intra Pliocene 3	639 m	(631 ms)
Base Pliocene:	665 m	(643 ms)
Base Late Miocene:	901 m	(896 ms)

Note:

No chronostratigraphic information was collected in the tophole section of the well (from seabed down to 400 m RKB TVD). Consequently, the interpretation of the different formations in this area is based on the MWD logs, seismic character and previous work.

Mud logging commenced at 400 m RKB TVD.

6 Depth interval (m RKB TVD & Two Way Time) and age of sand bodies shallower than 1000 m under the seabed. Note which layers if any contain gas:

No data exists on background gas levels from seabed down to 400 m (section drilled with returns to seabed). No gas related incidents were reported when drilling this interval.

The following sand bodies have been identified in well 30/9-20S:

Pleistocene
263-272m, 277-286m, 298-306m

Pliocene
Possible thin silt/sand layer at 461m causing the gas related incident.
588-615m, 639-640m, 647-648m, 652-655m, 660-661m

Miocene
665-706m, 712-716m, 723-729m, 739-743m, 751-754m, 756-771m, 782-803m, 811-824m, 831-842m

Oligocene
901-918m, 959-989m, 1017-1019,5m, 1095-1120m

7 By what means is the presence of gas proven:

A 9 7/8" pilot hole was drilled from 208 to 484 m MD with sea water to check for shallow gas in the 26" section interval. Gas flow from the well was detected while drilling. The well was displaced to 1,20 sg mud and flow checked. Gas was still perculating and the well was displaced to 1,5 sg mud in two circulations before the well was stable on flow check. The MWD logs indicate gas levels at 461 m - 461,5 m (increased resitivity and reduced gamma values). Gas measurement (chromatography) showed gas peaks at the following levels:

Logged Depth (mTVD)	Total Gas Peak(%)	Bg Gas (%) (C1-C3)
399,9	1,91	0,5
415,9	1,04	0,3
465,9	2,05	0,7

8 Composition and origin of gas:
N/A

9 Describe all measurements taken in gas bearing layers:

Wireline logs and chromatography.

10.2 Seismic data

10 Given depth and extent of any gas blanking ("gass-skygging"), seismic anomalies etc.:

The 2D high resolution and 3D exploration seismic have been examined for amplitude anomalies and other indications of shallow gas down to the Upper Oligocene (950 m RKB). No amplitude anomalies have been mapped at the 30/9-20S Well Location.

11 Note any indication of gas originating from deeper levels. Give description in cases where gas comes from deeper layers:

N/A

12 How does the interpretation of the site survey correspond to the well data with respect to:

12a Shallow Gas:

The seismic data does not show any amplitude anomaly or other shallow gas indications at the spud location. However, due to gas flow at the well head in wells 30/9-17 and 30/9-18 (approx. 2800 m to the south-west), where the origin of the observed gas neither could be identified on logs nor seismic data, a weak shallow gas warning was issued for the Pliocene interval at the planned well location 30/9-20 S.

Gas flow from the well was detected while drilling Pliocene layers. The MWD logs indicate a gas level in intra Pliocene at 461 m - 461,5 m (increased resitivity and reduced gamma values).

12b Sand Bodies:

The Pleistocene, Pliocene and Miocene sand layers were predicted, and encountered sand layers correspond with the interpretation except Base Utsira which where prognosed 54 m shallower than observed. An upper Oligocene sand layer where prognosed 31 m deeper than observed and one where not prognosed..

12c Boulders:

Scattered boulders were predicted in the shallow section between 180 m - 250 m. No boulders layers were predicted. No boulders were encountered.

12d Unconformities (depths in metres RKB (TVD)):

Horizon		*Prognosed (P)*	*Observed (O)*	*Difference (O-P)*
Base Pleistocene	:	293 ± 17 m	306 m	+ 13 m (deeper)
Intra Pliocene 1	:	342 ± 23 m	362 m	+ 20 m (deeper)
Intra Pliocene 2	:	490 ± 28 m	490 m	0 m
Intra Pliocene 2b	:	565 ± 32 m	588 m	+ 23 m (deeper)
Intra Pliocene 3	:	627 ± 33 m	639 m	+ 12 m (deeper)
Base Pliocene (T.U.)	:	662 ± 36 m	665 m	+ 3 m (deeper)
Base Utsira	:	892 ± 41 m	842 m	- 54 m (shallower)
Base Miocene	:	892 ± 15 m	901 m	+ 9 m (deeper)

The differences between the prognosed and observed depths to different formation tops were within the uncertainty limits, except for Base Utsira. The difference between the predicted and observed depths at Base Utsira is caused by discrepancies in the seismic pick.

12e Correlation to Nearby Wells:

The drilling conditions experienced in well 30/9-20S are as predicted and similar to those encountered in tie-wells (30/6-15, 17 and 18).

11 Standard and Special Studies

- Norsk Hydro: Discovery Evaluation Report 30/9-20 S, R structure, PL 104. September 2002. NH 0071499
- Norsk Hydro: Geochemical characterization and correlation, well 30/9-20S and Oseberg fluids. August 2002. NH-00049577.
- Norsk Hydro: Standard Core Description Well 30/9-20 S. August 2002. NH-00049745.
- Norsk Hydro: Well 30/9-20 S, Biostratigraphy of the interval 425-3123 m. Geostrat, August 2002.
- Norsk Hydro: Composition Analysis of MDT Samples from well 30/9-20S. August 2002.
- Norsk Hydro: Formation Evaluation Report, Well 230/9-20 S, PL104. September 2002.
- Reslab: Core Analysis Report, Well 30/9-20S. April 2002.
- Reslab: Core Photographs, white and UV light, scale 1-4, well 30/9-20 S, 2002.
- Corpro: Special Core Analysis, Well 30/9-20S, Capillary Pressure. 2002.
- Oilphase, 2002: Field Operation Report, Well 30/9-20S, NH 00043830 (06/03/2002)
- Petrotech:Validity Checks and Analysis of MDT Samples from Well 30/9-20 S. May 2002.
- Schlumberger 2002: Zero Offset, 30/9-20 S. NH-00065892
- Schlumberger Anadrill, 2002: End of Well Report/logs, well 30/9-20 S.
- Schlumberger: OBMI Image Processing Dip Picking & Interpretation, Well 30/9-20 S, Oseberg South. September 2002.
- Geoservice: End of Well Report, Surface Logging Data well 30/9-20 S. September 2002.

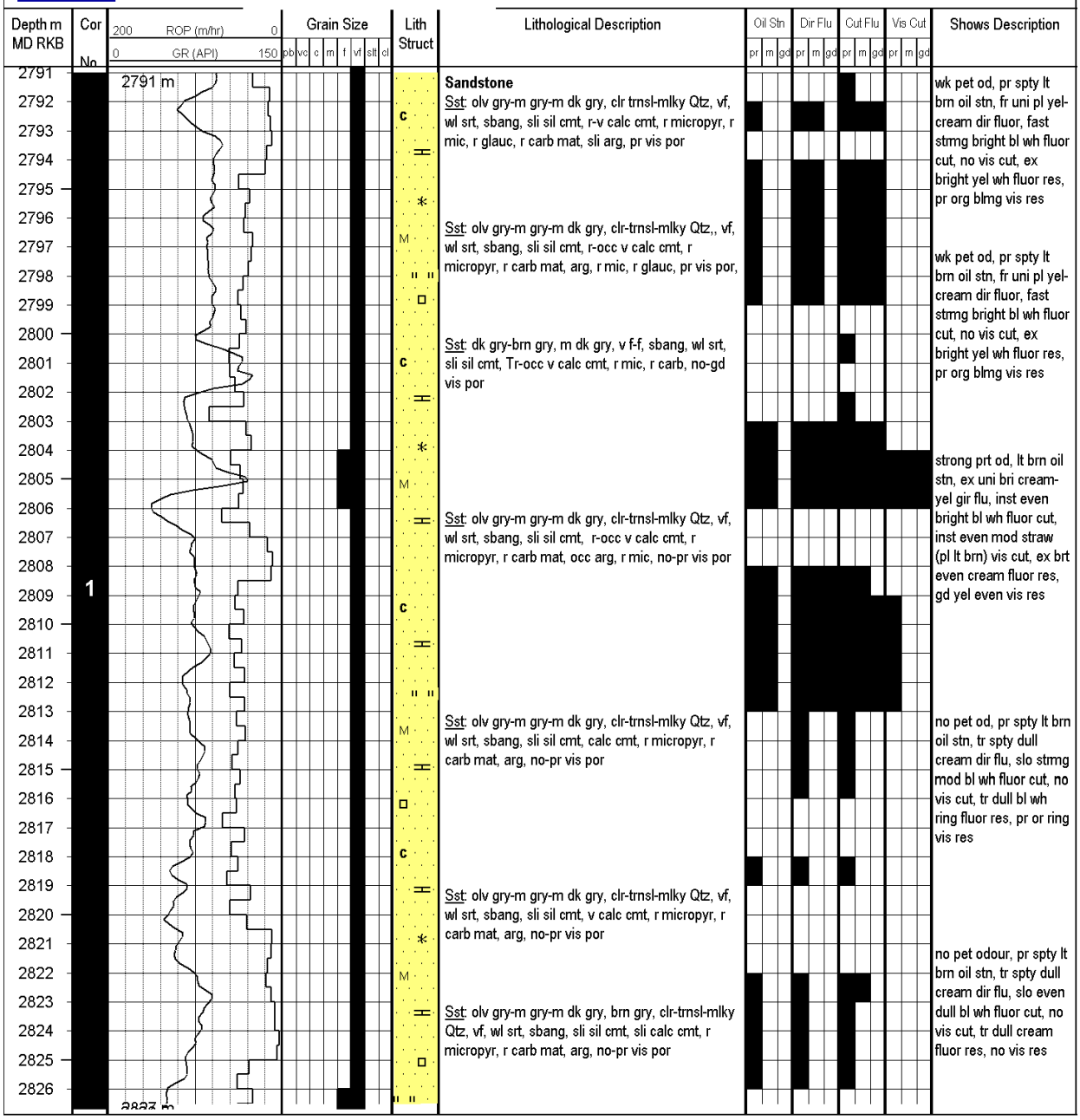
APPENDIX I

CORE DESCRIPTIONS

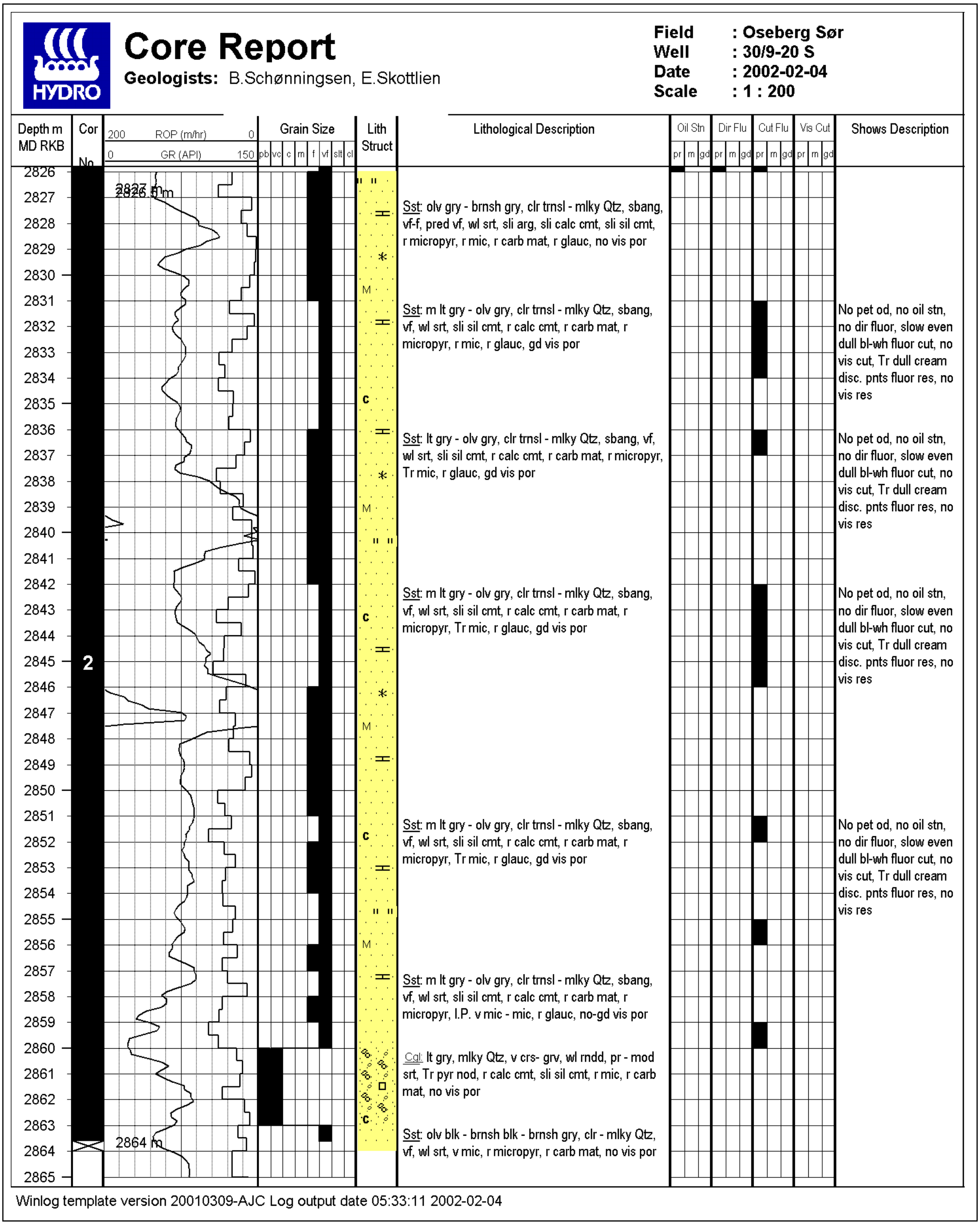
Core Report

Geologists: B.Schønningsen, E.Skottlien

Field : Oseberg Sør
Well : 30/9-20 S
Date : 2002-02-04
Scale : 1 : 200



Winlog template version 20010309-AJC Log output date 05:30:20 2002-02-04


Core Report
Geologists: B.Schønningsen, E.Skottlien
Field : Oseberg Sør
Well : 30/9-20 S
Date : 2002-02-04
Scale : 1 : 200
Depth m MD RKB
Cor No
200 ROP (m/hr) 0
0 GR (API) 150
Grain Size
pb vc c m f vf slt cl
Lith Struct
Lithological Description
Oil Stn
Dir Flu
Cut Flu
Vis Cut
pr m gd
Shows Description
2826
2827
2828
2829
2830
2831
2832
2833
2834
2835
2836
2837
2838
2839
2840
2841
2842
2843
2844
2845
2846
2847
2848
2849
2850
2851
2852
2853
2854
2855
2856
2857
2858
2859
2860
2861
2862
2863
2864
2865
2
2826.5m
2827 m
2864 m
Sst: olv gry - brnsh gry, clr trnsl - mlky Qtz, sbang, vf-f, pred vf, wl srt, sli arg, sli calc cmt, sli sil cmt, r micropyr, r mic, r carb mat, r glauc, no vis por
Sst: m lt gry - olv gry, clr trnsl - mlky Qtz, sbang, vf, wl srt, sli sil cmt, r calc cmt, r carb mat, r micropyr, r mic, r glauc, gd vis por
No pet od, no oil stn, no dir fluor, slow even dull bl-wh fluor cut, no vis cut, Tr dull cream disc. pnts fluor res, no vis res
Sst: lt gry - olv gry, clr trnsl - mlky Qtz, sbang, vf, wl srt, sli sil cmt, r calc cmt, r carb mat, r micropyr, Tr mic, r glauc, gd vis por
No pet od, no oil stn, no dir fluor, slow even dull bl-wh fluor cut, no vis cut, Tr dull cream disc. pnts fluor res, no vis res
Sst: m lt gry - olv gry, clr trnsl - mlky Qtz, sbang, vf, wl srt, sli sil cmt, r calc cmt, r carb mat, r micropyr, Tr mic, r glauc, gd vis por
No pet od, no oil stn, no dir fluor, slow even dull bl-wh fluor cut, no vis cut, Tr dull cream disc. pnts fluor res, no vis res
Sst: m lt gry - olv gry, clr trnsl - mlky Qtz, sbang, vf, wl srt, sli sil cmt, r calc cmt, r carb mat, r micropyr, Tr mic, r glauc, gd vis por
No pet od, no oil stn, no dir fluor, slow even dull bl-wh fluor cut, no vis cut, Tr dull cream disc. pnts fluor res, no vis res
Sst: m lt gry - olv gry, clr trnsl - mlky Qtz, sbang, vf, wl srt, sli sil cmt, r calc cmt, r carb mat, r micropyr, I.P. v mic - mic, r glauc, no-gd vis por
Cgl: lt gry, mlky Qtz, v crs- grv, wl rndd, pr - mod srt, Tr pyr nod, r calc cmt, sli sil cmt, r mic, r carb mat, no vis por
Sst: olv blk - brnsh blk - brnsh gry, clr - mlky Qtz, vf, wl srt, v mic, r micropyr, r carb mat, no vis por
Winlog template version 20010309-AJC Log output date 05:33:11 2002-02-04

APPENDIX II

SIDEWALL CORE DESCRIPTIONS

NORSK HYDRO	SIDEWALL CORE DESCRIPTION	WEL: 30/9-20 S
		RIG: Transocean Arctic

Run: 1A	Date: 31.01.02	Log: MSCT-GR			Page : 1 of 3
Cored: 27	Missed: 1	Lost: 0	Empty : 0	Recoverd : 26	Geologist : Schønningsen/Skottlien

No.	Depth m RKB	Recoverd cm	Lithology and shows description	Fluorescence					
				Direct			Cut		
				Tr	M	G	Tr	M	G
1	2950.5	5	100 % Sst: med lt gry-lt olv gry-brn gry, clr trnsl Qtz, v f-f, sbang-sbrndd, wl srt, slily calc cmt, mnr Kao Mtx, v slty, arg, C frag, micromic-mic, pr vis por Tr C : blk-brn, blky, brit, frm Shows: n.s						
2	2945.5	5	100 % Sst: med lt gry-brn gry, clr trnsl Qtz, v f-f, sbang-sbrndd, wl srt, slily calc cmt, mnr Kao Mtx, v slty grad Sltst, arg, C frag, micromic-mic, pr vis por Shows: n.s.						
3	2 943	3.5	100 % Clst: dk gry-brn blk, blky, brit, mod hd, v carb, slily slty						
4	2940.5	5	100 % Sltst: pl brn-brn gry, sbblky-blky, occ lam, frm-mod hd, slily calc, v f sdy, arg, carb Mat, Tr Micromic						
5	2 939	5	100 % Sst: v lt gry-lt gry, clr trnsl-occ mlky wh Qtz, v f-f, sbang, wl srt, frm-mod hd, calc cmt, Kao Mtx, r carb frag, fr vis por Shows: no HC od, no O stn, 30% v wk yel wh dir Flour, no vis Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res	X					
6	2925.5		missed sample						
7	2 922	5	100 % Sst: a.a Shows: n.s						
8	2918.5	5	100 % Sst: v lt gry-lt gry-lt brn gry, clr trnsl-mlky wh Qtz, v f-f, pred f, sbang, wl srt, frm, slily calc cmt, Tr Kao Mtx, r carb frag, pr-fr vis por Shows: no HC od, 20% spt v lt brn O stn, 20% v wk yel wh dir Flour, slw strmg yel v wk bl Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res	X					
9	2905.2	5	100 % Sltst: gry blk-brn blk, blky, frm-mod hd, non calc, slily arg, v carb, v micromic Shows: n.s						
10	2902.5	5	100 % Sltst: a.a						
				Tr:Trace M:Medium G:Good					

Comments:

NORSK HYDRO	SIDEWALL CORE DESCRIPTION	WELL: 30/9-20 S
		RIG : Transocean Arctic

Run: 1A	Date: 31.01.02	Log: MSCT-GR				Page : 2 of 3
Cored: 27	Mi 0	Lost: 0	Empty : 1	Recoverd : 26	Geologist : : Schønningsen/Skottlien	

No.	Depth m RKB	Recoverd cm	Lithology and shows description	Fluorescence					
				Direct			Cut		
				Tr	M	G	Tr	M	G
11	2898.2	5	100 % Sltst: a.a						
12	2 887	5	100 % Sst: med lt gry-lt brn gry, clr trnsl-mlky wh Qtz, v f-f, sbang, wl srt, frm, slily calc cmt, Tr Kao Mtx, carb frag, micromic, pr vis por Shows: no HC od, no O stn, 10% spt v wk yel wh dir Flour, no Fluor cut, no vis cut, spt bl wh Fluor res, no vis res	X					
13	2876.5	5	100 % Sst: med lt gry-lt brn gry, clr trnsl-mlky wh Qtz, v f, sbang-sbrndd, wl srt, frm-mod hd, slily calc-calc cmt, Tr Kao Mtx, carb frag, micromic, pr vis por Shows: no HC od, no O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res						
14	2875.3	5	100 % Sst: med gry-brn gry, clr trnsl Qtz, v f-f, pred f, sbrndd, wl srt, mod hd, slily calc cmt, r carb frag, micromic, pr vis por Shows: no HC od, 20% spt lt brn O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res	X					
15	2 790	5	100 % Sst: lt gry-lt brn gry, clr trnsl Qtz, v f-f, sbrndd, wl srt, mod hd, slily calc-calc cmt, r carb frag, r micromic, pr vis por Shows: no HC od, 20% spt lt brn O stn, v wk bl yel dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res	X					
16	2787.5	5	100 % Sst: a.a Shows: no HC od, 20% spt lt brn O stn, no dir Flour, no Fluor cut, no vis cut, no Fluor res, no vis res	X					
17	2 777	5	100 % Sst: med gry-brn gry, clr trnsl Qtz, v f, sbang-sbrndd, wl srt, frm, slty grad Sltst, calc cmt, Tr carb frag, micromic-occ v micromic, no-pr vis por Shows: no HC od, 20% spt lt brn O stn, v wk bl yel dir Flour, no Fluor cut, no vis cut, spt brt bl wh Fluor res, no vis res	X					
18	2774.5	5	100 % Sst: a.a Shows: no HC od, 90% mod brn-brn gry O stn, no dir Fluor, v wk bl yel Fluor cut, no vis cut, spt brt bl wh Fluor res, no vis res		X				
				Tr:Trace M:Medium G:Good					

Comments:

NORSK HYDRO **SIDEWALL CORE DESCRIPTION** **WELL:** 30/9-20 S

RIG : Transocean Arctic

Run: 1A	Date: 31.01.02	Logging: MSCT-GR			Page : 3 of 3
Cored: 27	Missed: 0	Lost: 0	Empty: 1	Recoverd : 26	Geologist : Schønningsen/Skottlien

No.	Depth m RKB	Recoverd cm	Lithology and shows description	Fluorescence					
				Direct			Cut		
				Tr	M	G	Tr	M	G
19	2772.5	5	100 % Sst: a.a Shows: no HC od, 30% mod brn O stn, no dir Fluor, v wk bl yel Fluor cut, no vis cut, spt brt bl wh Fluor res, no vis res	X					
20	2 772	5	100 % Sst: a.a Shows: a.a	X					
21	2 764	5	100 % Sst: med gry-brn gry, clr trnsl Qtz, v f, sbrndd, wl srt, frm, slty grad Sltst, v calc cmt, Tr carb frag, micromic, no-pr vis por Shows: no HC od, 10% spt lt brn O stn, v wk bl yel dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res	X					
22	2762.5	5	100 % Sst: a.a Shows: a.a	X					
23	2 756	5	100 % Sst: v f-f, else a.a Shows: a.a	X					
24	2753.5	5	100 % Sst: a.a Shows: a.a	X					
25	2750.5	5	70 % Sst: med lt gry-lt olv gry, clr trnsl Qtz, v f-f, sbrndd, wl srt, frm, slily calc cmt, Kao Mtx, glauc, r carb frag, r micromic, no-pr vis por 30 % Ls: lt brn-pl brn, blky, mod hd, sdy, arg Shows: no HC od, no O stn, no dir Flour, no Fluor cut, no vis cut, spt v wk bl wh Fluor res, no vis res						
26	2748.5	5	100 % Sst: v lt gry-lt gry, clr trnsl Qtz, v f, sbang-sbrndd, wl srt, frm, calc cmt, Kao Mtx, r glauc, r carb frag, no-pr vis por Shows: a.a						
27	2747.5	5	100 % Sst: v lt gry-lt gry, clr trnsl Qtz, v f-f, sbang-sbrndd, wl srt, frm, slily calc cmt, Tr Kao Mtx, r glauc, no-pr vis por Shows: a.a						

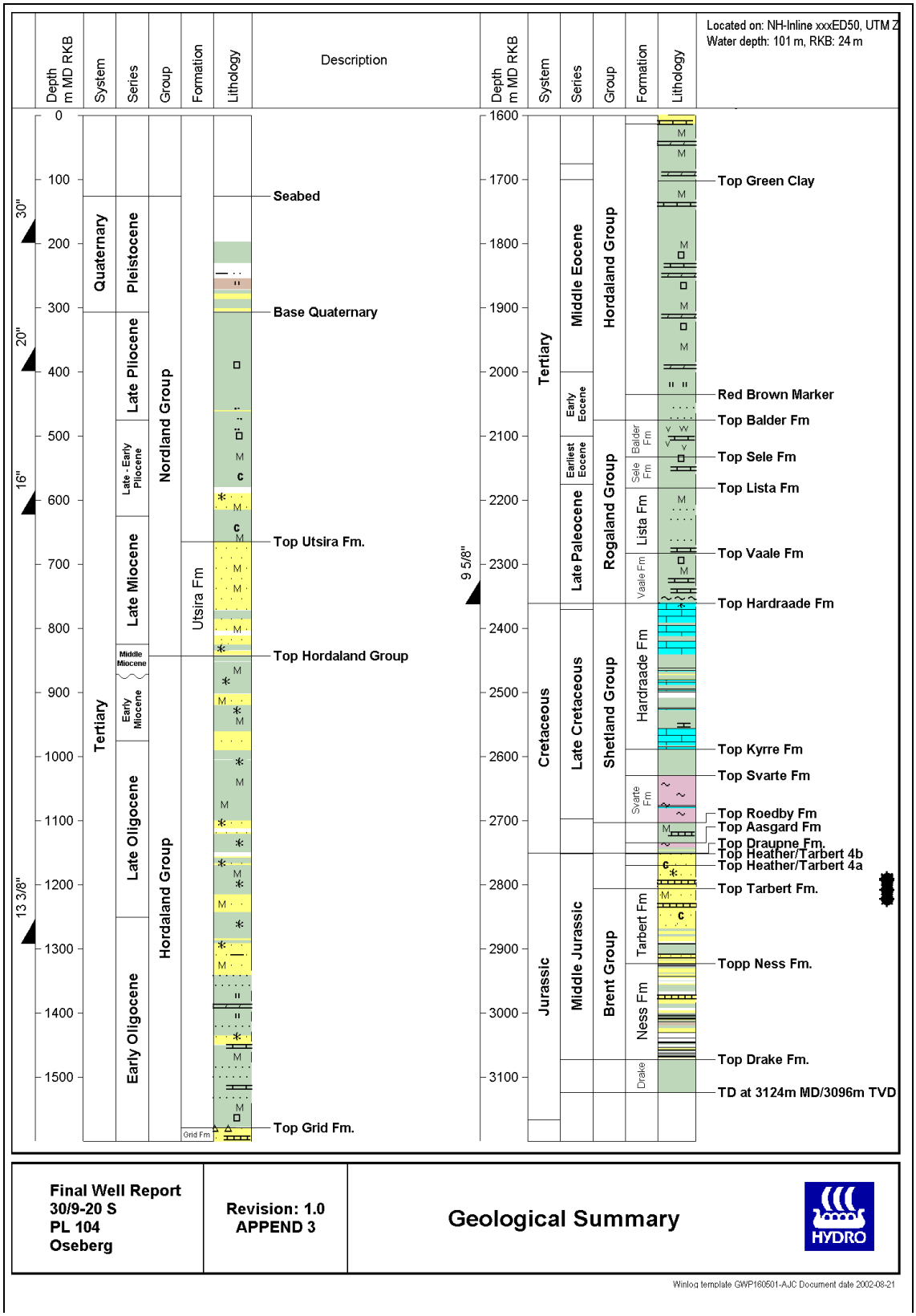
Tr:Trace M:Medium G:Good

APPENDIX III

WELL SUMMARY

GEOLOGICAL WELL SUMMARY

WELL SUMMARY



Final Well Report **30/9-20 S** **PL 104** **Oseberg**	**Revision: 1.0** **APPEND 3**	**Geological Summary**

Winlog template GWP160501-AJC Document date 2002-08-21

SECTION B

OPERATIONS

Prepared by: G. Smaaskjær

Approved by: T. Skram

LIST OF CONTENTS

TABLES

FIGURES

1 DRILLING SUMMARY AND EXPERIENCES

1.1 Mobilising

Total time used:	44.0 hrs	
Operational time:	44.0 hrs	(100 %)
Downtime:	0 hrs	

Wellhead co-ordinates :

6 686 904.0 mN 0 489 002.8 mE

Rig heading:

216 degrees

The rig move towards well 30/9-20 S started on 07 January 2002 at 04:00 and anchor handling was finished on 08 January 2002 at 24:00.

1.2 36" Hole Section / 30" Conductor

Water depth:	125.0 m	
Total depth of section:	198.0 m	
30" Conductor shoe:	198.0 m	
Total time used:	26.0 hrs	
Operational time:	26.0 hrs	(100 %)
Downtime:	0.0 hrs	

1.2.1 Drilling

The well was spudded on 09 January 2002, at 00:20 hrs.

A 36" rotary BHA with 17 1/2" Smith 10GMODPD insert bit and 36" hole opener was run and the section was drilled to TD at 198.0 m (17 1/2" bit at 200 m). The section was drilled with sea water and hi-visc pills. After drilling, high-visc was pumped and the hole displaced to 1,50 SG mud before a wiper trip was performed to 5 m below seabed. The hole was displaced once more to 1.5 SG mud prior to pulling out of hole.

1.2.2 Casing

The 30" conductor with the Permanent Guide Base. The casing was washed down the last few meters due to fill. The conductor was cemented back to the sea bed with good returns and held for 6 hrs prior to releasing the conductor running tool. The wellhead inclination was less than 1 degree after releasing the conductor running tool.

1.3 9 7/8” Pilot Hole

Total depth of section:	484.0 m	
Total time used:	28.5 hrs	
Operational time:	12.5 hrs	(44.6 %)
Downtime:	16.0 hrs	(55.4 %)

1.3.1 Drilling

Ran in hole with a 9 7/8" 10 MF insert bit and drilled out hard cement from 192 m to shoe at 198.0 m. Drilled out shoe and cleaned out 17 1/2" rathole to 200 m. The rathole was reamed several times until able to pass through without rotation, and the hole was swept with hi-visc pill.

Continued to drill 9 7/8” pilot hole down to 484 m with seawater and hi-visc pills with rig in shallow gas mode and the ROV with sonar at bottom.

Detected gas from well at 484 m and displaced to 1.2 sg. kill mud. Flow checked the well, but gas was still percolating form the well. Displaced then to 1.5 sg mud in two circulation's and flow checked the well again and observed that the well was stable. Started to pull out of hole but observed at 305 m that the well was flowing. Ran down to 322 m and displaced well with 1.5 sg mud again, but well not stable. Displaced 33 m3 of 1.6 sg mud in well and observed that the well was again stable. Ran in hole again down to 484 m with pumps off. Observed only minor flow. The well was then displaced back to 1.5 sg mud. The reason for changing back to 1.5 sg mud was based on not able to see mud level in wellhead with 1.6 sg and only minor or no returns while running in hole. Pumped out from 484 m to 185 m, above tagged cement in the 30” conductor. A final flow check was performed prior to pulling out with pilot hole assembly.

Ran in hole with a 3 1/2" cement stinger and spotted a gas tight 1.92 sg cement plug from 484 to 450 m. Pulled up to 384 m and circulated bottom up with 1.5 sg mud prior to pulling out of hole.

1.4 26” hole Section/ 20” casing

Total depth of section:	400.0 m	
20" casing shoe	397.8 m	
Total time used:	72.0 hrs	
Operational time:	49.0 hrs	(68.1 %)
Downtime:	23.0 hrs	(31.9 %)

1.4.1 Drilling

Ran in hole with a 26" Smith insert bit MO2SODC and opened up the 9 7/8” pilot hole to 26” down to 400 m. The hole was displaced to 1.5 sg bentonite mud all the way to seabed before pulling out of hole. A final flow check was performed at the 30” shoe with no indications of gas.

1.4.2 Casing

Ran the 20" casing to 398 m without any problems. A 16” No-GO Adapter was installed in the 20” casing at 344 m.

Mixed and pumped 68 m3 of 1.44 sg lead cement and 23.2 m3 of 1.92 sg tail cement. Had good returns to seabed prior to pumping tail cement. Bumped cement plug and continued to pressure test the casing to 50 bar.

Ran BOP and riser and pressure tested wellhead connector to 345 bar.

1.5 17" Hole Section

Total depth of section:	630.0 m	
Total time used:	29.5 hrs	
Operational time:	29.5 hrs	(100 %)
Downtime:	0.0 hrs	

1.5.1 FIT

Ran in hole with a 17" Smith Mill tooth MSDGHC bit and drilled and tagged float collar at 384 m. Pressured tested the casing to 89 bar using sea water. Drilled hard cement from 385 m to 398 m. Cleaned rattle and drilled 3 m of new formation. The hole was displaced to 1.3 sg mud while drilling out the shoe track. Pulled into the 20" shoe and performed a FIT to 1.5 sg with 1.3 sg mud.

1.5.2 Drilling

Continued and drilled a 17" hole through the deepest prognosed shallow gas level at 620 m and set section TD at 630 m.

1.6 20" Hole Section / 16" Liner

Total depth of section:	630.0 m	
16" liner shoe	621.6 m	
Total time used:	48.0 hrs	
Operational time:	48.0 hrs	(100 %)
Downtime:	23.0 hrs	

1.6.1 Drilling

Ran in hole with a bull nose and 20" Red baron under reamer and opened up the 17" hole to 20" down to 623 m. Massive losses on the shaker and a carbide test at TD showed the average hole size to be 21.22".

Ran in hole with a Red baron 17 1/2" Under reamer and opened up the inside of the 20" casing from 365 m trough the shoe at 402 m

1.6.2 Casing

Ran 22 joints of 16" casing and landed liner in No-Go adapter on second attempt and verified that hanger had latched.

Dropped ball and mixed and pumped 13.5 m3 of 1.5 sg gas tight slurry, followed by 1.9 sg tail slurry. Dropped dart and displaced with 1.3 sg mud. No indication that top plug had sheared. Changed to rig pumps and displaced cement. Stopped displacement after theoretical displacement volume was reached. Unable to pressure test casing to 70 bar. Remaining pressure was bled off and it was verified no back flow, prior to setting seal assembly as per Dril-Quip procedure. The hanger seal assembly was set on second attempt.

1.7 17-1/2" Hole Section / 13 3/8" casing

Total depth of section:	1297.0	m	
13 3/8" casing shoe	1291.0	m	
Total time used:	81.5	hrs	
Operational time:	81.0	hrs	(99.4 %)
Downtime:	0.5	hrs	(0.6 %)

1.7.1 Drilling

Ran in hole with a 14 1/2" Reed bit. Tagged plugs at 596 m. Drilled trough plugs and hit hard cement at 605 m. Drilled shoe track and cleaned out rat hole down to 626 m. Pulled out of hole

Ran in hole with a 14 1/2" Schlumberger Milltooth bit and a 17 1/2" under reamer. Drill & under reamed hole slowly down to 630 m while displacing to 1.2 sg mud. Continued to drill to section TD of 1297 m without any further problems. Flow checked well and rotated string to ensure that under reamer had retracted prior to pulling out of hole.

1.7.2 Casing

The casing was then run to 1291 m without any problems.

Mixed and pumped 27.8 m3 of 1.92 sg tail slurry. No pump pressure was observed during theoretical displacement. When evaluating theoretical displacement , it was observed return flow with the pumps off, indicating U-tube due to heavy mud still inside casing. Suspected one(or two) pumps not giving correct volume distribution. Continued pumping another 800 strokes before observing pressure increase, an indication of bumping the plug. Allowed pressure to build up to 50 bar before dropping the ball (assumed ball shearing out of bottom plug seat). Continued to pump and pressure tested the casing to 130 bar.

Set seal assembly as per Dril-Quip procedure and pressure tested same and BOP to 275 bar.

1.8 12-1/2" Hole Section / 9-5/8" Casing

Total depth of section:	2369.0	m	
9 5/8 casing shoe:	2362.0	m	
Total time used:	133.0	hrs	
Operational time:	125.5	hrs	(94.4 %)
Downtime:	7.5	hrs	(5.6 %)

1.8.1 LOT

The cement in the 13 3/8" shoe track and 3 m new formation was drilled out with a Smith 12 1/4" MRS82PX bit using 1.20 SG KCL water based mud. A leak off test (LOT) was performed and gave a formation strength of 1.68 SG equivalent mud weight (EMW) at 1300m MD.

1.8.2 Drilling

Displaced hole to 1,2 SG oil based mud after the leak off test and continued drilling with the 12 1/4" Power Drive and a Smith MRS82PX PDC bit. Drilled and attempted to orient 12 1/4" hole down to 1365 m but no response from the Powerdrive. Continued to drill 12 1/4" hole down to 1454 m but still no response from the Powerdrive. Pulled out of hole to change out Powerdrive

Function tested new Powerdrive and ran in hole and drilled and oriented 12 1/4" hole to 1580 m where ROP dropped drastically. Wellpath had turned according to plan and the mud weight had been raised to 1.45 sg starting at 1503 m. Continued to drill slowly through hard formation down to 1596 m. In the end hardly any progress and the bit was pulled out of hole

Changed out Powerdrive due to wear and ran in hole with a Smith Insert 15GFDDP bit. Drilled hard formation down to 1615 m. Continued to drill and orient 12 1/4" hole down to section TD of 2369 m. Slow drilling from 2360 m (top Shetland Fm.)

1.8.3 Casing

The 9 5/8" casing was run to 2362.0 m without any problems. The cement plug was bumped and the casing was pressure test to 275 bar. The 9 5/8" seal assembly was set and both seal assembly and BOP was pressure tested to 275 bar.

1.9 8-1/2" Hole Section

Total depth of section:	3124.0 m		
Total time used:	179.5	hrs	
Operational time:	175.0	hrs	(97.5 %)
Downtime:	4.5	hrs	(2.5 %)

1.9.1 FIT

The cement in the 9 5/8" shoe track and 4 m new formation was drilled out with a motor assembly and a Smith 8 1/2" M36SPX bit using 1,30 SG Oil based mud. A formation integrity test (FIT) confirmed formation strength of 1,60 SG equivalent mud weight (EMW) at 2372 m MD.

1.9.2 Drilling

Continued drilling 8 1/2" hole with the motor assembly and a Smith 8 1/2" M36SPX bit using 1.30 SG oil base mud as drilling fluid and drilled 8 1/2" hole to coring point at 2790.5 m. Pulled out of hole for coring.

Ran in hole after coring with a motor assembly and a Smith 8 1/2" M36SPX bit and reamed interval from 2787 m to 2864.5 m prior to drilling 8 1/2" hole to well TD at 3124.0 m A wiper trip was performed prior to pulling out of hole

1.9.3 Coring

Two core was cut from 2790.0 to 2864.5 m using a Sequrity Diamond Board 8 1/2" FC274RLI core bit from. The core recovery for the first core was 35.5 m or 98.6 % and for the second core 37.15 m or 99 %

1.9.4 Logging

The well was logged according to the logging program. The following runs were run;

WIRELINE logs:

Run:	Toolstring:	Date:	Logged interval (mRKB)	Comments:
1A	AIT-IPLT	31/01.02	3124 - 2362	
1 A	MSCT-GR	31/01.02	2950.5-2747.5	27 cores cut, 1 crushed, 1 empty
1A	VSP-GR	31/01-01/02.02	3120 - 2040.0	0 offset VSP.
1A	MDT/GR	01/02-02/02.02	2934.5 - 2746.5	37 pressure test, 6 tight + 2 oil sample and 1 water sample
1 A	OBMI-DSI-GR	02/02.02	3120-2362.0	

1.10 Plug and Abandonment

Total time used:	196.5 hrs	
Operational time:	123.0 hrs	(62.6 %)
Downtime:	73.5 hrs	(37.4 %)

The well was permanently abandoned with cement plug from TD to 132 m inside the 9 5/8" casing. The cement plug was not tagged with the required 10 mT down force and a 9 5/8" Bridge plug was run as pressure barrier and set at 2103 m. The Bridge plug was then pressure tested to 70 bar above LOT.

A 250 m cement plug was dumped on top of the bridge plug after the pressure test

The 9 5/8" casing was then cut at 392 m and the 9 5/8" casing and seal assembly was pulled in one go (no lock-ring installed on the 9 5/8" casing).

A 13 3/8" Bridge plug was set at 380 m . The Bridge plug was run as pressure barrier and the plug was then pressure tested to 88 bar (70 bar above LOT).

The 13 3/8" casing was then cut at 364 m and the 13 3/8" casing and seal assembly was pulled in one go.

A 200 m cement plug was dumped on top of the 13 3/8" bridge plug from 350 to 140 m, 15 m below seabed. The cement plug was load tested to 10 mT and pressure tested to 77 Bar (70 bar above LOT).

The 20"/30" casing was cut 5 meters below seabed and pulled to together with the 18 5/8" wellhead.

However due to bad weather the pulling of the anchors where greatly delayed and 60 hours of down time was recorded for this.

A final seabed survey was performed as well while anchor handling and location was left 11 February 2002 at 02:30 hrs.

1.11 Recommendations

Drilling of long 12 1/4" section with OBM and full removal off all cuttings to shore for destruction requires a good logistics plan. A 12 1/4" hole requires 1 skip per stand drilled, while in the 8 1/2" section one can drill 3 stands per skip as a rule of thumb.

The use of the Powerdrive together with a proper bit and oil based mud greatly increases the ROP even if a rotary steerable system is not required for steering purposes.

The bit selection was optimised to use both new and rerun bits. Due to the shallow gas the number of section drilled was increased and hence several new bits and unde reamers had to be used. The 12 1/4" hole section was drilled with a new 12 1/4" MRS82PX (IADC M123) PDC bit. The bit drilled at 50.7m/hr to a depth of 1566m where a calcite cemented sandstone bed was encountered. This bed was expected to be 5 - 10m in thickness but actually extended to 34m in thickness to a depth on 1600m. The ROP with the PDC bit was 2m/hr through the calcite cemented sandstone. The PDC bit was tripped a 1596m due to low ROP and was graded 2-2-WT-A-X-I-NO-ROP. The next bit run was a new 12 1/4" 15GFDPD (IADC 445) Insert bit which drilled the remaining 4m of the calcite stringer at 2m/hr and then increased ROP to 22m/hr in the shale to TD of the 12 1/4" section at 2791m. The bit was graded 1-2-CT-H-E-I-BT-TD.

Due to the shallow gas it was decided to case of the gas zone with a 16" liner to avoid a long cement job behind a possible deep set 13 3/8" casing. It felt that even with the extra time spent drilling and setting the 16" liner, time was saved during the plug and abandonment. A shallow set 16" liner ensured higher success rate for the cement job covering the gas zone, and thus avoiding possible punching and squeeze jobs over the gas zone if a deep set 13 3/8" casing had been run instead.

During the Plug and Abandonment of well 30/6-26, considerable time was spent waiting for cement to set up. In the end the bottom plug could not be tagged even after waiting for 24 hrs after the cement was pumped.

For the 30/9-20 S well the open hole was cemented from TD into the 9 5/8" casing. The cement was dressed off and a 9 5/8" bridge plug was run as the pressure barrier. Considerable time was saved compared to waiting for cement to cure. In addition a 200 m cement plug was dumped on top of the plugs in order to comply with Norsk Hydro’s Steering documentation on Plug and Abandonment.

GENERAL INFORMATION ON WELL 30/9-20 S

Field : OSEBERG **Country** : NORWAY

Licence : 104 **Installation** : TRANSOCEAN ARCTIC

UTM zone : 31 **Central Median** : 3' E **Horiz. Datum:** ED50

Location coordinates:		**Surface**	**Target**
UTM	**North [m]:**	6686904.0	6687101.0
UTM	**East [m]:**	489002.8	488892.8
Geographical	**North :**	60 19'01.68"	
Geographical	**East :**	02 48'03.38"	

Water Depth: 101.0 **m** **Reference Point Height:** 24.0 **m**

Formation at TD: AMUNDSEN at 3072 m MD

Operators:	NORSK HYDRO PRODUKSJON A/S	**Share:** 34.00 **%**
Partners:	PETORO	**Share:** 30.00 **%**
	DEN NORSKE STATS OLJESELSKAP A/S	20.00 **%**
	CONOCO PETROLEUM NORGE A/S	11.00 **%**
	EXXON MOBIL	5.00 **%**

Total depth (RKB) : 3124.0 **m MD** 3095.7 **m TVD**

TIME SUMMARY

Start Time : 07-01-02 04:00:00

Spudding date : 09-01-02

Abandonment date : 07-02-02

Main operation	**Hours**	**Days**	**%**
MOBILIZATION	62.5	2.6	7.5
DRILLING	437.0	18.2	52.1
FORMATION EVALUATION MWD	2.5	0.1	0.3
FORMATION EVALUATION LOGGING	70.0	2.9	8.3
FORMATION EVALUATION CORING	37.0	1.5	4.4
PLUG AND ABANDONMENT	104.5	4.4	12.5
DOWNTIME MOBILIZATION	17.5	0.7	2.1
DOWNTIME DRILLING	47.5	2.0	5.7
DOWNTIME FORM. EVAL. CORING	4.0	0.2	0.5
DOWNTIME PLUG AND ABANDONMENT	56.0	2.3	6.7
Sum:	**838.5**	**34.9**	

Hole and casing record

Hole	**Track**	**Depth [m MD]**	**Casing/Tubing**	**Track**	**Depth [m MD]**
36"		200.0	30"		198.0
26"		400.0	20"		397.8
20"		626.0	16"		621.6
17 1/2"		1297.0	13 3/8"		1291.0
12 1/4"		2369.0	9 5/8"		2362.0
8 1/2"		3124.0			

Well status: PERMANENTLY ABANDONED

Norsk Hydro

BRØNN 30/9-20 DRILLING

Periode 07/2002		BOKFØRT	DAGRAPP	EVT.	NY FINAL	BUDSJ.	AVSETN.
EDI	TEKST	TOTAL	ESTIMAT	KORR.	COST	TOTAL	07/2002
0	EMPLOYEE RELATED COSTS	7,373,925	7,907,813	-33,888	7,873,925	7,627,500	500,000
1	RIGCOSTS	58,705,348	62,787,820	-4,082,472	58,705,348	60,562,147	0
2	RIG SUPPORT COSTS/REIMBURSABLES	6,964,066	5,864,361	1,099,705	6,964,066	7,249,954	0
						0	
3A	FUEL/LUB	1,851,550	3,514,583	-1,663,033	1,851,550	3,390,000	0
3C	BITS	1,990,724	2,287,176	-296,452	1,990,724	2,512,176	0
3D	CASING/CASING EQUIPMENT	7,200,621	5,104,081	2,196,540	7,300,621	3,522,613	100,000
3E	WELLHEAD/X-MASTREE	2,138,765	1,833,360	305,405	2,138,765	1,583,360	0
3F	CEMENT/CEMENT ADDITIVES	1,518,033	1,631,692	-113,659	1,518,033	1,156,692	0
3G	MUD	2,954,803	3,790,700	-635,897	3,154,803	3,230,335	200,000
						0	
						0	
4B	CHARTERFLY	0	0		0	0	
4C	OTHER TRANSPORTATION	45,387	175,729	-80,342	95,387	169,500	50,000
4D	STANDBY VESSEL	2,886,440	2,460,208	-426,232	2,033,976	2,373,000	n/a
4F	HELICOPTER TRANSPORTATION	1,353,476	1,476,125	-122,649	1,353,476	1,423,800	n/a
4G	POOL VESSEL -*	7,663,359	7,714,583	-164,192	7,550,391	11,340,000	n/a
						0	0
5A	CORING	349,043	321,450	27,593	349,043	321,450	0
5B	DRILLING TOOLS	847,972	3,130,276	-2,182,304	947,972	3,125,874	100,000
5C	CUTTING OF CASING	603,766	638,256	-34,490	603,766	508,486	-0
5D	COMPLETION SERVICES	0	0	0	0	0	0
5E	PERFORATION	0	0	0	0	0	0
5F	MWD SERVICES	4,376,429	3,439,443	936,986	4,376,429	2,468,925	0
5G	CASING OPERATIONS	345,444	727,604	-382,160	345,444	500,000	0
5H	MUD LOG - Noe tidsrel. + noe forbruk	639,877	1,063,888	-424,011	639,877	1,056,032	-0
5H	MUD SERVICES	0	0	0	0	0	0
5I	CEMENTING SERVICES	1,013,559	878,646	134,913	1,013,559	847,500	-0
5J	ELECTRICAL LOGGING	4,839,146	4,848,667	-9,521	4,839,146	4,848,667	0
5K	VSP- DSL	121,800	400,000	-178,200	221,800	400,000	100,000
5L	PROD TESTING	0	395,391	-395,391	-0	381,375	-0
5M	DIVING/ROV	1,040,025	1,340,532	-300,507	1,040,025	1,293,014	0
5N	RIGPOOL	1,220,350	808,354	411,996	1,220,350	779,700	0
5N	DIVERSE	1,519,499	3,263,542	-1,544,043	1,719,499	2,747,500	200,000
		0				0	0
6A	SITE SURVEY	0	564,844	-564,844	-0	900,000	-0
6B	RIG POSITIONING	319,000	627,604	-208,604	419,000	1,000,000	100,000
6C	DRILLING SITE CLEAN UP	0				0	0
						0	0
7	WAREHOUSE COSTS	1,800,489	1,933,021		1,933,021	1,864,500	n/a
					0	0	0
8	LAB COST	0	2,240,208	-2090208	150,000	1,985,000	150,000
SUM		121,682,896	133,169,958	-10,819,961	122,199,997	131,169,100	1,500,001

AVSETNING BORING	1,500,001
AVS. KOMPLETTERING	
TOTAL AVSETNING	1,500,001

DOWNTIME REPORT TRANSOCEAN ARCTIC

Last 213 days

Inst.	Wellname	Startdate	#	Sum hrs	Downtime Type	Responsible Contractor	Manufacturer	Short description	Equipment Type	Activity	Service Type	NSFI Code	NSFI Type	Serial Number
TOA	30/9-20 S	10-01-02	1	16.5	Kick	NORSK HYDRO A/S		Detected gas flow from well at 13:20 hrs. Displaced well to 1.20 sg mud. Flow checked well, gas still perculating from well.						
TOA	30/9-20 S	10-01-02	2	2.0	Other	TRANSOCEAN OFFSHORE EUROPE LIMITED		The thrust nut on topdrive was noted to be loose. Rectified problem.		DRILLING				
TOA	30/9-20 S	11-01-02	1.1	1.5	Other	NORSK HYDRO A/S		Re-loaded cement head and racked it back in derrick.		DRILLING				
TOA	30/9-20 S	11-01-02	1.2	3.5	Other	NORSK HYDRO A/S		Picked up 18 5/8" well head with 13 3/8" cross over. Released running tool. Disconnected and laid out plug mandrel and 13 3/8" plugs.		DRILLING				
TOA	30/9-20 S	12-01-02	3	16.0	Waiting on weather			Waited on weather to run BOP. Not able to get near stand by.		BOP INSTALLATIOI AND TESTING				
TOA	30/9-20 S	21-01-02	5	7.0	Equipment failure	ANADRILL	ANADRILL	Circulated bottoms up prior to POOH for Powerdrive change..	DRILLSTRING/DO EQUIPMENT	DRILLING	DIRECTIONAL DRILLING	357.08	Rotating Steerable System	
TOA	30/9-20 S	24-01-02	6	0.5	Equipment failure	TRANSOCEAN OFFSHORE EUROPE LIMITED	NATIONAL	Changed leaking washpipe.	DRILL FLOOR EQUIPMENT/SYS	DRILLING	DRILLING CONTRACTOI	317.00	Other Drill Floor Eq./Syst.	
TOA	30/9-20 S	26-01-02	9	0.5	Equipment failure	TRANSOCEAN OFFSHORE EUROPE LIMITED	MARITIME HYDRAULICS A/S	Failure on DDM pumps.	DRILL FLOOR EQUIPMENT/SYS	DRILLING	DRILLING CONTRACTOI	317.00	Other Drill Floor Eq./Syst.	
TOA	30/9-20 S	28-01-02	8	2.0	Equipment failure	TRANSOCEAN OFFSHORE EUROPE LIMITED	MARITIME HYDRAULICS A/S	Repaired hydraulic hoses on DDM.	DRILL FLOOR EQUIPMENT/SYS	CORING	DRILLING CONTRACTOI	317.00	Other Drill Floor Eq./Syst.	1687-21
TOA	30/9-20 S	29-01-02	7	2.0	Waiting on weather			PPOH to 2182 m due to bad weather. Max heave 5.5 m.		CORING				

Norsk Hydro

08-08-02

DOWNTIME REPORT TRANSOCEAN ARCTIC

Last 213 days

Inst.	Wellname	Startdate	#	Sum hrs	Downtime Type	Responsible Contractor	Manufacturer	Short description	Equipment Type	Activity	Service Type	NSFI Code	NSFI Type	Serial Number
TOA	30/9-20 S	07-02-02	11	10.0	Other	TRANSOCEAN OFFSHORE EUROPE LIMITED		Tested APM system		RIG MOVE/SKIDDI				
TOA	30/9-20 S	07-02-02	12	22.0	Waiting on weather			Waiting on weather		RIG MOVE/SKIDDI				
TOA	30/9-20 S	09-02-02	13	3.5	Waiting on weather			Waiting on weather		RIG MOVE/SKIDDI				
			Sum:	87.0										
			Total Sum:	87.0										

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 1 **Date:** 07-01-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 0.00 sg

Stop time	Description
04:00	No activety.
23:59	Rig in transit from 34/8-12 S. Position at midnigth N60 deg 48,41', E 003 deg 21,52'. Distance travelled 42 nautical miles, average speed 2,2 knots.. Distance to go 34,15 nautical miles.

Daily report no : 2 **Date:** 08-01-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.03 sg

Stop time	Description
09:30	Rig in transit from Gjøa.
23:30	On location. Anchor no 4 first anchor on bottom at 09:45 hrs. Anchor 8 on bottom 12:15 hrs, anchor 3 on bottom at 12:40 hrs, anchor 5 on bottom at 13:22 hrs, anchor 6 on bottom at 15:13 hrs, anchor7 on bottom 16:00 hrs, anchor 1 on bottom 16:45 hrs, anchor 2 last anchor on bottom at 20:35 hrs. Performed final tensioning of rig to 180 ton on all anchors except no 1 and 2 with fiber ropes which were tensioned to 200 ton.
23:59	Performed final positioning of rig.

Daily report no : 3 **Date:** 09-01-02

Midnight depth : 198 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.03 sg

Stop time	Description
06:30	Tagged seabed at 125 m with 5 ton. Penetration 0,3 m. Spudded well at 00:20 hrs. Drilled 36" hole from 125 m to section TD 198 m.
07:00	Swept hole with 25 m3 Hi-vis and displaced to 1,50 sg mud.
07:30	Performed wiper trip to right below seabed and ran back to bottom. No fill.
08:00	Swept hole with 25 m3 hi vis and displaced to 1,50 sg mud.
09:00	POOH and racked bottom hole assembly.
12:30	Held safety meeting. Rigged up and ran 30" conductor.
13:00	Landed casing in guide frame on trolley. Ran stinger inside.
14:30	Ran 30" condutor and PGB. Stabbed into well and ran in hole . Washed down with 26 m3 seawater last few meters due to tight hole. Landed on bottom with 1,5 m stick up.
16:00	Pressure tested cement lines to 100 bar. Mixed and pumped 23 m3 of 1,56 sg lead cement followed by 23 m3 1,95 sg tail cement. Displaced to 193 m with seawater.
23:00	Held string in slight tension while waiting on cement.
23:59	Released running tool with 5 right hand turns. POOH and laid out running tool.

Daily report no : 4 **Date:** 10-01-02

Midnight depth : 484 m MD **Estimated PP:** 1.35 sg **Mud weight:** 1.03 sg

Stop time	Description
02:00	Laid out cement stand and 36" bottom hole assembly.
03:00	Picked up 9 7/8" pilot hole assembly. Initialised MWD tool.
04:00	Continued running in hole with bottom hole assembly to 185 m.
04:30	Held shallow gas safety meeting. Washed down and tagged firm cement at 192 m.
05:00	Drilled cement from 192 m, shoe at 198 m and cleaned out rathole to 200 m.
07:00	Drilled new formation to 208 m. Reamed shoe several times and used hi-vis to clean hole.
13:30	Drilled 9 7/8" pilot hole from 208 m to 484 m with sea water. Pumped 2x2 m3 hi-vis every stand..
14:00	Detected gas flow from well at 13:20 hrs. Displaced well to 1.20 sg mud. Flow checked well, gas still perculating from well.
15:00	Displaced well to 1,50 sg mud in two circulations. Well stable on flow check.
16:30	Commenced POOH. After 1 stand at 452 m, the thrust nut on topdrive was noted to be loose. Rectified problem.
17:00	Continued POOH to 305 m. Observed well flowing.
18:00	Ran in to 322 m. Displaced 42,4 m3 1,50 sg mud into well. Well not stable. Displaced 33,6 m3 1,60 sg mud into well.
19:00	Flow checked well while raising mud weight to 1,60 sg in pits. Well stable.
19:30	Pumped 1,60 sg mud while running in hole 2 stands. Circulated bottoms up. No gas seen.
20:00	Ran in hole from 375 m to 484 m without pumping. Max drag 5 ton.
21:00	Displaced well to 1,50 sg mud with 1000 lpm. No gas in returns.
21:30	Flow checked well with 1,50 sg mud. Well stable.
23:00	Pumped out of hole from 484 m to 185 m, above top of tagged cement inside 30" conductor
23:30	Flow checked well. Well stable.
23:59	POOH with 9 7/8" pilot assembly.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 5 **Date:** 11-01-02

Midnight depth : 323 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.03 sg

Stop time	Description
00:30	Continued POOH with 9 7/8" pilot assembly. Racked everything in derrick.
01:00	Installed 3 1/2" handling equipment. Made up diverter sub and 2 stands 3 1/2" drill pipe. Installed bitsub with float.
03:00	Ran in hole with cement stinger on 5" drill pipe.
03:30	Pumped pipe volume of 1,50 sg mud. Pressure tested cement hose to 100 bar. Mixed and pumped 1,70 m3 of 1,90 sg gas tight cement and spotted same as balanced plug from 484 m to 450 m.
04:00	POOH with controlled speed to 392 m. Circulated bottoms up with 1,50 sg mud.
04:30	Flow checked well 30 min. Well stable.
05:30	POOH with cement stinger. Laid out float sub and diverter sub.
07:00	Re-loaded cement head and racked it back in derrick.
08:00	Picked up 18 5/8" well head with 13 3/8" cross over. Released running tool. Disconnected and laid out plug mandrel and 13 3/8" plugs.
10:30	Picked up 18 5/8" well head with 20" housing. Installed cement plugs and bore protector. Racked assembly in derrick.
11:30	Laid out 9 7/8" pilot assembly.
14:00	Picked up 26" rotary assembly and racked in derrick.
14:30	Made up diverter sub on 5" drill pipe. Ran in hole and tagged cement with 5 ton at 448 m.
15:30	Displaced well to sea water in 4 steps. Flow checked each step 5 min and final step 15 min. OK. Displaced hole back to 1,5 sg mud.
16:00	POOH and laid out diverter sub.
17:30	Made up 26" rotary assembly and ran in hole. Tagged hard cement at 192 m.
18:30	Drilled hard cement from 192 m to 198 m, shoe at 198 m and cleaned rathole to 200 m.
23:59	Opened 9 7/8" pilot hole to 26" from 200 m to 323 m with sea water and hi vis pills..

Daily report no : 6 **Date:** 12-01-02

Midnight depth : 400 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.50 sg

Stop time	Description
05:00	Drilled 26 " hole from 323 m to section TD 400 m.
05:30	Swept hole with 25 m3 hi-vis and displaced to 1,50 sg bentonite mud all the way to seabed.
07:30	POOH with 26" rotary assembly.
13:00	Rigged up and ran 20" casing to 270 m.
14:30	Made up 18 5/8" well head and ran in hole on landing string. Made up cement stand and landed well head with 20" shoe at 398 m.. Performed 25 ton over pull test.
15:00	Circulated casing volume with sea water.
16:30	Mixed and pumped 68 m3 of 1,44 sg lead cement followed by 23,2 m3 of 1,92 sg tail cement.
17:30	Displaced same to shear dart with cement pump and continued displacement with rig pumps. Bumped plug and pressure tested casing to 50 bar. Checked for back flow and released running tool.
18:30	Racked cement head in derrick. POOH and laid out running tool.
19:30	Commenced skidding BOP out
21:30	Rigged up and prepared to run BOP. Held safety meeting. Made up termination spool and 2 riser joints.
23:30	Skidded BOP to well center. Connected spool piece/riser and BOP. Prepared in moon pool to run in with BOP.
23:59	Waited on weather to run BOP. Not able to get near stand by.

Daily report no : 7 **Date:** 13-01-02

Midnight depth : 400 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.50 sg

Stop time	Description
15:30	Waited on weather to run BOP.
22:30	Prepared to run BOP. Lifted BOP and ran in water at 17:08 hrs. Landed same at 22:22 hrs. Performed over pull test.
23:59	Installed diverter and cleared rig floor.

Daily report no : 8 **Date:** 14-01-02

Midnight depth : 599 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Continued rigging down BOP equipment.
02:00	Made up multi purpose tool. Ran in hole and retrieved 20" bore protector.. POOH and laid out bore protector.
03:00	Ran in hole with BOP test tool
05:30	Tested well head connector to 35/275 bar. Function tested BOP on yellow pod and from mini panel on blue pod. POOH.
06:30	Ran in hole and installed 20" bore protector. POOH and laid out running tool.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 8 **Date:** 14-01-02

Midnight depth : 599 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.30 sg

Stop time	Description
09:30	Made up 17" BHA and ran in hole to 352 m. Washed down to 384 m and tagged float collar.
10:00	Pressure tested cement line to 150 bar. Pressure tested casing to 89 bar with seawater.
10:30	Performed choke drill.
12:00	Drilled float and shoe track with hard cement from 385 m to 398 m and 20" casing shoe at 398 m.. Cleaned out rathole to 400 m.
13:00	Drilled 3 m new formation to 403 m. Circulated and conditioned mud to even mudweight 1,30 sg.
13:30	Pulled into shoe and performed FIT to 1,50 sg EMW.
17:30	Drilled 17" hole from 403 m to 486 m. Max gas 2 pct.
18:30	Flow checked well. OK. Circulated bottoms up, max gas 0,7 pct. Closed BOP and inflow checked with water filled choke line against choke. OK.
23:59	Drilled 17" hole from 486 m to 599 m. Max gas 0,6 pct.

Daily report no : 9 **Date:** 15-01-02

Midnight depth : 630 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	Drilled 17" hole from 599 m to 630 m. Max gas 0,3 pct.
02:30	Circulated bottoms up for sample and evaluated same. Set TD of section at 630 m.
03:00	Took SCR. Flow checked well. OK. Pumped slug.
04:30	POOH. Pumped out from 520 m to casing shoe at 398 m due to tight hole..
05:30	Circulated bottoms up until clean.
07:00	Flow checked well. OK. POOH.
07:30	Laid out CDR tool and bit.
08:30	Loaded cement head.
09:30	Made up Bull nose, 20" underreamer and cross overs. Function tested underreamer.
11:00	Ran in hole with underreamer assembly to 344 m.
12:00	Took weight at 16" hanger interval (344 m). Worked string through to 360 m. Continued running in hole to 20" casing shoe at 398 m
13:00	Under reamed section from 398 m to 400 m. Heavy losses on shakers. Changed to max mesh.
19:00	Under reamed 17" hole to 20" from 400 m to 623 m.
20:30	Circulated hole clean. Flow checked well. OK.
21:30	POOH to 20" casing shoe. Tight spots from 570 m to 540 m and at 420 m. Max over pull 10 ton.
23:30	Reamed to bottom with 20" underreamer. Tight spots at 489 m and from 546 m to 555 m.
23:59	Circulated bottoms up to riser.

Daily report no : 10 **Date:** 16-01-02

Midnight depth : 630 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.31 sg

Stop time	Description
01:30	POOH with 20" underreamer assembly to casing shoe at 398 m. Hole in good condition.
03:00	POOH with 20" underreamer assembly in casing.
04:00	Laid out 17" stabilizer, one drill collar, bit sub, underreamer and bullnose.
06:00	Made up new underreamer assembly with 17 1/2" underreamer. Tested same.
07:00	RIH to 365m.
08:00	Underreamed inside 20" casing and through shoe to 402m, to 17 1/2".
08:30	Circulated bottoms up to above BOP. Pumped slug.
09:30	POOH.
10:00	L/d 17 1/2" underreamer assembly.
10:30	M/u 16" running tool assembly. L/d same.
11:30	R/u to run 16" liner.
16:30	Run 16" liner, a total of 22 jts. No losses while running same.
19:30	P/u formerly made up 16" linerhanger, w/ running tool, sealassy & plugs attached. M/u same to 16" liner. RIH w/ same, using 5" DP, V-150, as landing string.
21:00	While circulating w/ 1000lpm, landed hanger in dedicated profile on 2nd attempt. Stopped pumps and verified hanger latched, with 10MT overpull. Continued circulating casing volume through topdrive, meanwhile pressuretesting cementline to 345 bar.
22:00	Dropped ball and mixed and pumped 13.5 m3 1.50sg gastight lead slurry, followed by 10 m3 1.90sg tail slurry. Dropped dart and displaced cement with 1.30sg mud. No indications that topplug sheared.
23:00	Changed to rigpumps and continued displacement with these, pumping @1500lpm.. Stopped displacement after theoretical displacement calculations. Unable to pressuretest casing to 70 bar. No losses during displacement. Remaining pressure was bled off, and it was verified no backflow, prior to setting seal assy as per DQ procedure.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 10 **Date:** 16-01-02
Midnight depth : 630 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.31 sg

Stop time	Description
23:30	Closed UAP and pressured up stepwise to 140 bar, via killine, to set seal assy
23:59	Attempted to shear running tool free from seal assembly. No overpull observed. Suspected seal assembly not being set properly.

Daily report no : 11 **Date:** 17-01-02
Midnight depth : 870 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.22 sg

Stop time	Description
00:30	Set down all string weight, closed UAP and pressured up to 140bar to repeat setting procedure of sealassembly. Opened UAP and pulled string upwards. Shearpins between running tool and seal assembly sheared w/25MT overpull, indicating sealassembly set OK.
02:00	POOH. Checked running tool ok, before l/d same, and BJ mandrels.
03:00	Redressed and reloaded BJ cementhead with ball and dart. Racked in derrick.
05:00	M/u 14.5" bit. RIH w/same on 8" BHA. Tagged plugs @ 596m MD.
07:30	Drilled out plugs & FC. Drilled shoetrack, soft cement to 605m, thereafter firm cement. Drilled out shoe and cleaned rathole down to 626m MD.
08:00	Circulated bottoms up.
09:30	Pumped slug & POOH. Broke bit & bitsub.
10:30	M/u 14 1/2" bit & 17 1/2" underreamer. M/u MWD/CDR tool & initialise same.
12:00	RIH to 626m.
13:00	Drill & underream slowly to 630m, meanwhile displacing hole to 1.20sg mud.
14:00	Drill & underream 14 1/2" / 17 1/2" hole to 656m.
14:30	Changed pop off valve on MP #3.
23:59	Continued drill/underream 17 1/2" hole to 870m.

Daily report no : 12 **Date:** 18-01-02
Midnight depth : 1297 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.21 sg

Stop time	Description
23:30	Continued drilling & underreaming 14 1/2" / 17 1/2" hole to TD of section @1297m MD.
23:59	Circulated hole clean.

Daily report no : 13 **Date:** 19-01-02
Midnight depth : 1297 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.21 sg

Stop time	Description
01:00	Continued circulating bottoms up and until shakers clean. Pumped slug.
02:00	POOH.
03:30	Continued POOH. Racked all BHA in derrick. Broke bit.
05:30	RIH w/ multipurpose tool. Retrieved 18 3/4" boreprotector and pulled out with same. L/d boreprotector and MPT.
08:00	Rigged up to run 13 3/8" casing. Installed La Fleur circulation packer.
14:30	Run 13 3/8" casing until shoe @ 16" liner shoe.
19:00	Run rest of 13 3/8" casing, total 101 jts. L/d La Fleur packer, changed elevators & prepared to make up 13 3/8" casing hanger.
20:30	M/u 13 3/8" casing hanger & continued RIH w/casing on 5" DP landing string (V 150). M/u cement head stand, broke circulation & landed casing hanger in WH, while circulating with 500lpm.
21:30	Circulated casing volume, stepwise increasing pumprate up to 2400lpm.
22:30	Pumped 10m3 FW as spacer, prior to dropping ball. Mixed & pumped 27.8m3 1.92 sg tailslurry.
23:59	Dropped dart & displaced same with BJ to shear topplug. Sheared with +-75bar. Switched to rigpumps & performed rest of displacement with these. No pumppressure was observed during theoretical displacement. Evaluated situation when theoretical displacement performed (5600stk). Circulated a total of 8170stk (2570stk more than theoretical) before bumping plug!!. Observed steady pressure increase during last 1000stk, indicating heavy cement entering annulus. Pressuretested casing to 130bar, ok!.

Daily report no : 14 **Date:** 20-01-02
Midnight depth : 1297 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.20 sg

Stop time	Description
00:30	Continued pressuretesting casing to 130bar. Bled off pressure and checked for backflow, negative.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 14 **Date:** 20-01-02

Midnight depth : 1297 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.20 sg

Stop time	Description
03:00	Set sealassembly as per Drilquip procedure. Pressure tested same and BOP to 35/275 bar for 5/10 min.
04:00	Released r/t as per Drilquip procedure & POOH w/ same. L/d casing hanger r/t, & BJ plug mandrel.
06:00	M/u Multi Purpose Tool w/ cuptester attached & 13 3/8" wearbushing made up to same. RIH & set wearbushing. Perform BOP test of MPR to 35/275 bar, as well as relevant function tests. POOH w/ MPT.
06:30	Redressed & reloaded BJ remote operated cement head w/ ball & dart.
09:00	L/d 17 1/2" BHA from derrick.
10:00	M/u 12 1/4" BHA.
12:30	RIH. Tagged wiperplugs @ 1263m MD. Filled string & functiontested MWD tool.
13:00	Performed kidkdrill & chokedrill.
18:30	Worked to drill out cement plugs & floatcollar.
20:00	Drilled out shoetrack (firm cement) and through shoe @ 1291m MD. Cleaned rathole & drilled new formation to 1300m MD.
20:30	Circulated bottoms up & until shakers clean.
21:30	Pulled bit into shoe, lined up to pump down string & annulus. Performed LOT. EMW = 1.68sg.
22:30	Displaced well to 1.20sg Oil Based Mud (Versavert).
23:30	Prepared surface solids control equipment to handle OBM and oily cuttings.
23:59	Drilled stand down to 1304m MD.

Daily report no : 15 **Date:** 21-01-02

Midnight depth : 1297 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.45 sg

Stop time	Description
00:30	Programmed Powerdrive through pump manipulation, as per normal operation procedures.
02:00	Drilled 12 1/4" hole to 1365m MD / 1358m TVD. No response observed from Powerdrive settings.
02:30	Reprogrammed Powerdrive to maintain desired wellpath turn.
04:00	Drilled to 1423m MD. Unable to turn well path.
04:30	Repeated programming of Powerdrive to be able to turn wellpath.
05:00	Drilled to 1454m MD. No success in turning well path.
06:00	Circulated bottoms up.
08:00	POOH to change Powerdrive.
09:30	Pumped through Powerdrive to check functionality of same. No response. Changed to backup Powerdrive, tested same ok
11:30	RIH to 1422m MD.
12:00	Washed down to TD @ 1454m MD, meanwhile programming Powerdrive through pump manipulations.
15:30	Drilled from 1454m to 1580m MD, where ROP dropped drastically.
23:59	Slow drilling from 1580m MD to 1585m MD, suspected due to particularly hard layer.

Daily report no : 16 **Date:** 22-01-02

Midnight depth : 1596 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.45 sg

Stop time	Description
15:30	Continued drilling slowly through suspected hard formation to 1596m MD.
16:00	Slugged pipe & tripped out of open hole.
18:00	Continued POOH. Broke bit.
20:00	Changed Powerdrive due to wear. M/u new 12 1/4" bit & functiontested new Powerdrive ok.
23:30	RIH, picking up 6 ea 8" DC's on way.
23:59	Continued RIH to 1585m. Washed down to bottom, no fill.

Daily report no : 17 **Date:** 23-01-02

Midnight depth : 2128 m MD **Estimated PP:** 1.25 sg **Mud weight:** 1.45 sg

Stop time	Description
23:59	Drilled 12 1/4" hole from 1596-2128 MD. Broke through hard spot at 1615 m. Surveyed each connection.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 18 **Date:** 24-01-02

Midnight depth : 2369 m MD **Estimated PP:** 1.20 sg **Mud weight:** 1.45 sg

Stop time	Description
04:30	Drilled 12 1/4" hole from 2128-2220 m.
05:00	Changed leaking washpipe.
18:30	Continued drilling from 2220-2369 m. Slow drilling from 2360 m (top Shetland). Average ROP +/- 2 m/hr.
19:00	Flowchecked 10 min. Slugged pipe.
20:30	POOH.
23:00	POOH. Laid down Powerdrive.
23:59	Made up Multi Purpose Tool. RIH and POOH wear bushing.

Daily report no : 19 **Date:** 25-01-02

Midnight depth : 2369 m MD **Estimated PP:** 1.20 sg **Mud weight:** 1.45 sg

Stop time	Description
19:00	Held safety meeting with crew. Rigged up and ran 9 5/8" casing. Filled every joint.
21:00	Laid down Lafleur. Installed casing hanger assy. Changed handling equipment. RIH on landing string and landed casing at 20:50 hrs while circulating 500 ltr. Took Vetco measurements.
22:00	Continued to circulate casing volume. Increased flow to 2000 lpm in steps. No losses. Pumped 15 m3 spacer with rig pumps.
23:00	Mixed and pumped cement according to programme.
23:30	Displaced cement with rig pumps. Bumped plug at 5222 strokes. Pressured up to 81 bar. Total strokes 5237.
23:59	Pressure tested casing to 275 bar / 10 min OK.

Daily report no : 20 **Date:** 26-01-02

Midnight depth : 2369 m MD **Estimated PP:** 1.20 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Bled off casing test pressure and checked for backflow OK.
01:30	Set seal assy and pressure tested same against UPR to 275 / 35 bar. Sheared tool with 30 ton. Flushed string, relanded and retested seal assy too 275 bar OK.
02:30	POOH landing string. Laid down BJ subs and DQ tool.
03:00	Made up Multi Purpose Tool and wear bushing. RIH same.
06:30	Pressure tested BOP to 35/275 bar on yellow pod. Function tested from minipanel on blue pod.
07:00	POOH and laid down MPT.
08:30	Pressure tested IBOP, mud hose, drilling stand safety valve to 35/345 bar.
10:30	L/D 12 1/4" BHA.
14:00	Cleared rig floor. Made up 8 1/2" BHA. Installed radioactive sources.
19:00	RIH 8 1/2" BHA. Filled string at 1000 m and tested MWD tools. Function tested lower rams while filling string at 2000 m.
19:30	Performed choke drill.
20:00	RIH to 2288 m. Washed down and tagged float at 2320 m.
22:30	Drilled out plugs and float. Displaced to 1.30 SG while drilling out plug and float. Soft cement from 2321-2340 m. Firm cement from 2340-2346 m.
23:00	Failure on DDM pumps.
23:59	Drilled out casing shoe and cleaned rathole.

Daily report no : 21 **Date:** 27-01-02

Midnight depth : 2369 m MD **Estimated PP:** 1.20 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Drilled 3 m new formation from 2369-2372 m.
01:30	Circulated bottoms up.
02:00	Performed FIT to 1.60 SG.
20:30	Drilled 8 1/2" hole from 2372-2790.5 m. Max gas: 4.5 %.
21:30	Circulated bottoms up for samples. Flowchecked OK. Made survey and took SCRs.
23:59	Slugged pipe. POOH.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 22 **Date:** 28-01-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	Continued to POOH 8 1/2" BHA.
03:00	Held prejob meeting. Retrieved radioactive source. Dumped MWD/LWD tools and racked same. Broke bit.
05:30	Held prejob meeting. Picked up and made up 120' core barrel and core head.
10:30	RIH coring assy #1 to 2768 m. Filled string at 1000 m and 2000 m.
11:00	Washed down from 2768 m to TD. Took up/down weights 125/116 ton. Spaced out. Deballasted rig 4 m.
13:30	Cut core #1 from 2791-2827 m. Broke core with 25 ton.
14:00	Circulated. Flowchecked OK.
19:00	Slugged pipe. POOH.
20:30	Held prejob meeting. Recovered core #1. 35.5 m - 98.6% recovery. Chekced bit.
21:30	Picked up and made up new inner barrel.
23:30	Repaired hydraulic hoses on DDM.
23:59	RIH coring assy #2.

Daily report no : 23 **Date:** 29-01-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
03:30	Continued to RIH coring assy #2 to 2653 m.
05:00	POOH to 2182 m due to bad weather. Max heave 5.5 m.
05:30	WOW. Max heave 4.5 m and decreasing.
07:30	Continued to RIH coring assy. Established circulation at 1000 lpm. Tagged bottom at 2827 m. Observed 3 m heave.
09:00	Circulated bottoms up at 1500 lpm - 130 bar.
12:30	Racked drilling stand. Spaced out. Dropped ball, circulated down same. Cut core #2 from 2827.5-2864.5 m. Broke core with 7 ton.
18:00	Flowchecked 15 min OK. POOH 5 stands. Slugged pipe. Continued POOH.
20:00	Held pre-job meeting. Recovered core #2. 37.15 m recovery - 99%.
21:30	Laid down cement stand.
23:00	Programmed LWD tools, loaded source. Set scribeline.
23:59	RIH 8 1/2" BHA. Filled string at 1100 m, and tested MWD/LWD tools.

Daily report no : 24 **Date:** 30-01-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
03:30	Continued to RIH 8 1/2" BHA to casing shoe.
04:30	Slipped and cut drilling line.
05:30	Continued to RIH 8 1/2" BHA to 2787 m.
08:00	Reamed / logged cored section from 2827-2864 m.
15:30	Drilled 8 1/2" from 2864-3124 m.
17:30	Circulated bottoms up at 2020 lpm -280 bar. Boosted riser. Flowchecked OK.
19:30	Pulled wet to 2986 m. Pumped slug. Continuted to POOH. Tight spot at 2850 m, worked same OK. Some initial drag in cored section, worked same OK.
23:59	Continued to POOH 8 1/2" BHA. Laid down mud motor and MWD/LWD tools.

Daily report no : 25 **Date:** 31-01-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	Rigged up Schlumberger.
11:00	Logging run #1, IPLT.
18:00	Logging run #2, MSCT.
23:59	Logging run #3, VSP.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 26 **Date:** 01-02-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
04:00	Logging run #3, VSP.
23:59	Logging run #4, MDT. Performed 36 pressure points. Took 5 oil samples at 2766,5 m MD RKB.

Daily report no : 27 **Date:** 02-02-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
10:00	Logging run #4, MDT. Took 4 oil samples at 2807 m. Took 4 water samples at 2868 m.
22:00	Logging run #5, OBMI-DSI. Took 2 full passes from TD to casing shoe. Took cased hole DSI log from casing shoe to 2050 m.
23:30	Installed 3 1/2" handling equipment and RIH 8 stands 3 1/2" cement stinger.
23:59	Changed handling equipment and RIH 5" drillpipe.

Daily report no : 28 **Date:** 03-02-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
02:30	RIH 3 1/2" cement stinger.
03:30	Circulated bottoms up. Max gas 49%. Meanwhile pressure tested cement line/hose to 150 bar.
05:00	Pumped 4 m3 spacer with BJ. Mixed and pumped 11 m3 1.90 SG silica cement slurry. Displaced with 1.5 m3 spacer and 22 m3 1.30 SG Versavert mud.
05:30	POOH slowly to 2810 m.
06:30	Circulated bottoms up. 2100 lpm - 200 bar. Max gas 5.6%.
08:30	Pumped 4 m3 spacer. Mixed and pumped 11 m3 1.90 SG silica cement slurry. Displaced with 1.5 m3 spacer and 19.3 m3 Versavert mud.
09:00	POOH to 2500 m.
09:30	Circulated bottoms up. 2700 lpm - 290 bar.
11:00	Laid down single. Installed circulation joint. Pumped 4 m3 spacer. Mixed and pumped 9 m3 1.90 SG G-cement slurry. Displaced with 1.3 m3 spacer and 17.3 m3 Versavert mud.
11:30	POOH to 2220 m.
12:30	Circulated bottoms up. 2700 lpm - 290 bar. Flushed kill & choke lines. Pumped slug. Dropped 2" rabbit.
15:30	POOH.
20:00	Made up CT tool and 9 5/8" bridge plug. RIH slowly to 2203 m. Dropped ball and chased same with 6.8 m3 mud. Sheared plug with 200 bar. Sheared tool and tagged plug.
21:30	Pumped 4 m3 spacer. Mixed and pumped 7.4 m3 1.90 SG cement slurry. Displaced same with 1.5 m3 spacer and 14.7 m3 Versavert mud.
22:30	POOH slowly to 1950 m. Pumped string volume
23:30	Displaced 50 m3 slop down hole.
23:59	POOH while laying down pipe.

Daily report no : 29 **Date:** 04-02-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
06:00	POOH cement stinger while laying down pipe.
08:00	POOH while laying down 3 1/2" pipe. Laid down cicrulation sub, CT tool. Cleared rig floor.
11:30	Made up 9 5/8" spear assy. Racked same. Made up 9 5/8" cutting assy. Tested same. RIH.
12:30	Cut 9 5/8" casing at 392 m. Closed upper annular. Checked flow and pressure. Negative.
14:00	POOH cutter assy.
15:00	RIH with spear assy. Pulled casing free at 14:45 hrs. Closed upper annular. Checked for flow. POOH.
19:00	Held prejob meeting. POOH and laid down 9 5/8" casing.
19:30	Cleared rig floor.
21:30	Made up CT tool and 13 3/8" bridge plug. RIH.
22:00	Set bridge plug at 380 m and tested same to 88 bar.
23:59	POOH while laying down pipe.

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 30 **Date:** 05-02-02

Midnight depth : 3124 m MD **Estimated PP:** 1.05 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	POOH and laid down drill pipe, x-over and CT tool.
04:00	Made up 13 3/8" casing cutting equipment and tested same. RIH.
04:30	Cut 13 3/8" casing at 364 m. Flowchecked. No flow.
06:30	POOH while laying down pipe.
07:00	Laid down 9 5/8" spear assy.
08:30	Made up 13 3/8" spear assy. RIH. Closed upper annular. Pulled casing free. Checked for flow and pressure. Negative.
11:30	POOH and laid down 13 3/8" casing.
12:00	Cleared up rig floor.
13:30	Made up ported sub. RIH and made up cement circulation assy. Tested same to 150 bar.
14:00	Circulated bottoms up at 373 m with 2200 lpm.
15:00	Set cement plug no. 5 according to programme.
16:00	POOH slowly to 140 m.
16:30	Displaced to seawater and flushed kill and choke lines, BOP at high rate.
18:00	POOH. Laid down excess drill pipe. Rigged down weatherford power tong.
19:00	Laid down 13 3/8" casing cutter.
23:59	Laid down DCs and drill pipe from derrick.

Daily report no : 31 **Date:** 06-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	RIH and tagged cement plug with 10 ton. Tested same to 77 bar.
03:00	POOH while laying down drill pipe and HWDP.
05:00	Prepared to pull BOP.
11:00	Disconnected BOP at 05:15 hrs. Pulled BOP and riser.
14:30	Skided BOP to park position. Cleared rig floor.
18:00	Made up 20"/30" cutting assy.
21:00	Cut 20"/30" casing approx 5 m below seabed and pulled housings/guide base free with 5 ton overpull.
22:00	POOH weallhead and guide base and set same on moon pool trolley..
23:59	Laid down wellhead cutting equipment.

Daily report no : 32 **Date:** 07-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	Laid down wellhead and running tool.
04:00	Laid down pipe while backloaded bulk and equipment.
06:30	Backloaded all bulk and service equipment.
16:30	Tested APM system
23:59	Waiting on weather

Daily report no : 33 **Date:** 08-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
23:59	WOW

Daily report no : 34 **Date:** 09-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
14:30	WOW
20:30	Started anchor handling. Anchor no 6 on bolster at 1725, no 7 on bolster at 1752 and no 2 on bolster at 2000 hrs. Stopped anchor handling due to unexpected increase in wind and sea.
23:59	Waiting on weather

DAILY REPORT ON WELL 30/9-20 S

Daily report no : 35 **Date:** 10-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
14:00	Waiting on weather
23:59	Anchor handling. Anchor no.3 on bolster at 1600 hrs. Anchor no1 on bolster at 1930 hrs. Anchor no 5 on bolster at 2000 hrs.

Daily report no : 36 **Date:** 11-02-02

Midnight depth : m MD **Estimated PP:** sg **Mud weight:** 1.30 sg

Stop time	Description
02:30	Anchor no 4 on bolster at 0200 hrs. Anchor no 8 on bolster at 0230 hrs. Transocean Artic off Norsk Hydro Contract at 0230 hrs.
23:59	No activity. Transocean Artic in transit to Ølen. Waiting for daylight before sailing into Ølen

TIME DISTRIBUTION

Well: 30/9-20 S **PO:** 1 **Start date:** 01-01-80 **Rig:** TRANSOCEAN ARCTIC **Depth:** 3124.0 **m MD**
All sections **Stop date:** 08-08-02

Operations	Hours	%	Hours	%	Acc. total
MOBILIZATION					
MOVING	29.5	3.52			
MOORING; RUNNING ANCHORS	14.5	1.73			
MOORING; PULLING ANCHORS	18.5	2.21			
Sum.			62.5	7.45	62.5
DRILLING					
BHA HANDLING/TESTING	23.5	2.80			
EQUIPMENT TEST	6.5	0.78			
MWD HANDLING/TESTING/SURVEYING	4.0	0.48			
TRIPPING IN CASED HOLE	45.0	5.37			
TRIPPING IN OPEN HOLE	16.5	1.97			
DRILLING	173.0	20.63			
OTHER	1.5	0.18			
UNDERREAMING	10.0	1.19			
WELLHEAD EQUIPMENT INSTALLATION	8.0	0.95			
CIRC. AND COND. MUD/HOLE	13.5	1.61			
WIPER TRIP	0.5	0.06			
CASING HANDLING/TESTING	6.5	0.78			
RUNNING CASING IN CASED HOLE	41.0	4.89			
RUNNING CASING IN OPEN HOLE	15.5	1.85			
DRILLING OUT OF CASING	4.5	0.54			
PRIMARY CEMENTING	23.0	2.74			
TRIPPING FOR CEMENT JOB	3.0	0.36			
CEMENT EVALUATION	0.5	0.06			
DRILLING OUT CEMENT PLUG	13.0	1.55			
FORMATION STRENGTH TESTING	3.0	0.36			
BOP HANDLING	7.0	0.83			
BOP RUNNING/RETRIEVING	7.0	0.83			
BOP TESTING	7.5	0.89			
WELLHEAD EQUIPMENT HANDLING	2.5	0.30			
SLIP AND CUT DRILLING LINE	1.0	0.12			
Sum.			437.0	52.12	499.5
FORMATION EVALUATION MWD					
LOGGING WITH MWD	2.5	0.30			
Sum.			2.5	0.30	502.0
FORMATION EVALUATION LOGGING					
LOGGING	21.0	2.50			
LOGGING EQUIPMENT HANDLING/TESTING	2.0	0.24			
FORMATION TESTER	30.0	3.58			
SIDEWALL CORING	7.0	0.83			
VERTICAL SEISMIC	10.0	1.19			
Sum.			70.0	8.35	572.0
FORMATION EVALUATION CORING					
TRIPPING IN CASED HOLE	9.0	1.07			
CORING EQUIPMENT/CORE HANDLING	7.0	0.83			
TRIPPING IN OPEN HOLE	13.0	1.55			
CORING	6.0	0.72			
CIRC. AND COND. MUD/HOLE	2.0	0.24			
Sum.			37.0	4.41	609.0
PLUG AND ABANDONMENT					
TRIPPING IN CASED HOLE	7.5	0.89			
OTHER	10.0	1.19			
CIRC. AND COND. MUD/HOLE	5.5	0.66			
TRIPPING FOR CEMENT JOB	22.5	2.68			
BOP HANDLING	5.5	0.66			
BOP RUNNING/RETRIEVING	6.0	0.72			
WELLHEAD EQUIPMENT HANDLING	6.0	0.72			
SET CEMENT PLUG	9.0	1.07			

TIME DISTRIBUTION

Well: 30/9-20 S **PO:** 1 **Start date:** 01-01-80 **Rig:** TRANSOCEAN ARCTIC **Depth:** 3124.0 **m MD**
All sections **Stop date:** 08-08-02

Operations	Hours	%	Hours	%	Acc. total
PLUG AND ABANDONMENT					
SET MECHANICAL PLUG	7.0	0.83			
TRIPPING OF CASING CUTTING EQUIPMENT	9.0	1.07			
CUT CASING/WELLHEAD	6.5	0.78			
CASING RETRIEVING	10.0	1.19			
Sum.			104.5	12.46	713.5
DOWNTIME MOBILIZATION					
WAITING	17.5	2.09			
Sum.			17.5	2.09	731.0
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	9.5	1.13			
WAITING	16.0	1.91			
WELL CONTROL	16.5	1.97			
OTHER	5.5	0.66			
Sum.			47.5	5.66	778.5
DOWNTIME FORM. EVAL. CORING					
EQUIPMENT FAILURE AND REPAIR	2.0	0.24			
WAITING	2.0	0.24			
Sum.			4.0	0.48	782.5
DOWNTIME PLUG AND ABANDONMENT					
WAITING	46.0	5.49			
OTHER	10.0	1.19			
Sum.			56.0	6.68	838.5
Reported time (100.0 % of well total 838.5 hours) :					838.5

HOLE DEVIATION

Well: 30/9-20 S **Reference point:** RKB ; 24.0 **m** ABOVE MSL

Waterdepth: 101.0 **m** **Vertical to:** 124.9 **m** **Total Depth:** 3124.0 **m MD**

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**

Wellhead Coordinates, UTM: **North :** 6686904.00 **m,** **East :** 489002.80 **m**

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
0.00	0.00	0.00	DUMM	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125.00	0.00	0.00	MWD	6	125.00	0.00	0.00	0.00	0.00	0.00	0.00
140.13	0.24	136.80	MWD	6	140.13	-0.02	0.02	0.03	0.48	0.48	271.25
169.59	0.37	346.10	MWD	6	169.59	0.02	0.04	0.05	0.60	0.13	-153.46
188.00	1.09	330.60	MWD	6	188.00	0.23	-0.06	0.24	1.21	1.17	-25.26
222.10	0.90	290.30	MWD	6	222.09	0.61	-0.47	0.77	0.62	-0.17	-35.45
251.18	0.89	334.20	MWD	6	251.17	0.89	-0.78	1.19	0.69	-0.01	45.29
280.26	1.40	325.00	MWD	6	280.24	1.39	-1.08	1.76	0.56	0.53	-9.49
309.72	1.60	318.80	MWD	6	309.69	1.99	-1.56	2.53	0.26	0.20	-6.31
339.24	1.70	300.10	MWD	6	339.20	2.52	-2.21	3.35	0.55	0.10	-19.00
368.70	2.40	297.40	MWD	6	368.64	3.02	-3.14	4.36	0.72	0.71	-2.75
387.05	2.66	297.20	MWD	6	386.98	3.40	-3.86	5.14	0.43	0.43	-0.33
428.46	2.06	296.10	MWD	6	428.35	4.16	-5.38	6.80	0.44	-0.43	-0.80
487.62	2.03	298.50	MWD	6	487.47	5.13	-7.26	8.89	0.05	-0.02	1.22
516.53	1.76	295.00	MWD	6	516.37	5.56	-8.11	9.83	0.30	-0.28	-3.63
575.52	1.41	293.80	MWD	6	575.33	6.24	-9.59	11.44	0.18	-0.18	-0.61
615.16	1.28	290.20	MWD	6	614.96	6.59	-10.46	12.36	0.12	-0.10	-2.72
682.04	2.37	309.90	MWD	6	681.81	7.73	-12.22	14.46	0.56	0.49	8.84
711.63	3.35	314.10	MWD	6	711.36	8.73	-13.31	15.91	1.02	0.99	4.26
769.88	4.98	328.40	MWD	6	769.46	12.06	-15.85	19.92	0.99	0.84	7.36
799.29	5.45	333.40	MWD	6	798.75	14.40	-17.15	22.39	0.67	0.48	5.10
828.64	5.88	339.30	MWD	6	827.95	17.05	-18.30	25.02	0.74	0.44	6.03
857.66	5.62	343.00	MWD	6	856.83	19.80	-19.25	27.61	0.47	-0.27	3.82
886.68	4.99	344.10	MWD	6	885.72	22.38	-20.01	30.02	0.66	-0.65	1.14
975.60	5.88	356.20	MWD	6	974.24	30.64	-21.37	37.35	0.49	0.30	4.08
1006.01	6.16	359.40	MWD	6	1004.49	33.83	-21.49	40.07	0.43	0.28	3.16
1035.26	6.44	1.40	MWD	6	1033.56	37.03	-21.46	42.81	0.36	0.29	2.05
1064.65	6.77	1.30	MWD	6	1062.75	40.41	-21.38	45.72	0.34	0.34	-0.10
1093.86	7.01	3.20	MWD	6	1091.75	43.92	-21.25	48.78	0.34	0.25	1.95
1123.52	7.41	6.10	MWD	6	1121.18	47.62	-20.94	52.03	0.55	0.40	2.93
1152.87	7.58	5.60	MWD	6	1150.28	51.43	-20.55	55.39	0.19	0.17	-0.51
1182.63	8.42	9.10	MWD	6	1179.75	55.54	-20.02	59.03	0.98	0.85	3.53
1212.38	9.51	10.50	MWD	6	1209.14	60.10	-19.22	63.10	1.12	1.10	1.41
1241.91	10.64	13.90	MWD	6	1238.21	65.15	-18.12	67.62	1.30	1.15	3.45
1271.35	11.41	16.90	MWD	6	1267.11	70.57	-16.62	72.51	0.98	0.78	3.06
1281.02	11.67	18.10	MWD	6	1276.58	72.42	-16.04	74.17	1.10	0.81	3.72

HOLE DEVIATION

Well: 30/9-20 S **Reference point:** RKB ; 24.0 **m** ABOVE MSL

Waterdepth: 101.0 **m** **Vertical to:** 124.9 **m** **Total Depth:** 3124.0 **m MD**

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**

Wellhead Coordinates, UTM: **North :** 6686904.00 **m,** **East :** 489002.80 **m**

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
1318.63	13.25	15.40	MWD	6	1313.30	80.19	-13.72	81.36	1.34	1.26	-2.15
1348.28	13.64	13.90	MWD	6	1342.14	86.86	-11.97	87.68	0.53	0.39	-1.52
1377.97	13.50	14.40	MWD	6	1371.00	93.62	-10.27	94.18	0.18	-0.14	0.51
1407.24	13.65	14.50	MWD	6	1399.45	100.27	-8.56	100.63	0.16	0.15	0.10
1437.18	13.80	15.10	MWD	6	1428.54	107.14	-6.74	107.35	0.21	0.15	0.60
1467.09	14.93	10.60	MWD	6	1457.52	114.37	-5.10	114.48	1.59	1.13	-4.51
1496.17	16.32	3.60	MWD	6	1485.52	122.13	-4.16	122.20	2.41	1.43	-7.22
1523.62	16.27	356.90	MWD	6	1511.87	129.82	-4.12	129.88	2.05	-0.05	-7.32
1553.99	14.91	349.20	MWD	6	1541.13	137.91	-5.09	138.00	2.44	-1.34	-7.61
1601.23	12.98	338.70	MWD	6	1586.98	148.82	-8.15	149.04	2.02	-1.23	-6.67
1628.18	12.88	328.70	MWD	6	1613.25	154.21	-10.81	154.59	2.49	-0.11	-11.13
1658.18	13.22	316.80	MWD	6	1642.48	159.57	-14.90	160.26	2.70	0.34	-11.90
1690.17	12.85	306.80	MWD	6	1673.65	164.36	-20.25	165.61	2.14	-0.35	-9.38
1719.26	13.07	296.80	MWD	6	1702.00	167.79	-25.78	169.75	2.32	0.23	-10.31
1746.80	12.83	292.30	MWD	6	1728.84	170.35	-31.39	173.22	1.13	-0.26	-4.90
1776.96	12.15	295.50	MWD	6	1758.29	172.99	-37.35	176.97	0.96	-0.68	3.18
1807.82	11.73	298.00	MWD	6	1788.48	175.86	-43.05	181.05	0.65	-0.41	2.43
1835.21	11.82	296.70	MWD	6	1815.30	178.43	-48.02	184.77	0.31	0.10	-1.42
1865.88	12.52	292.80	MWD	6	1845.28	181.13	-53.89	188.97	1.06	0.68	-3.81
1893.64	13.61	290.50	MWD	6	1872.32	183.44	-59.72	192.91	1.30	1.18	-2.49
1923.43	13.88	289.40	MWD	6	1901.25	185.85	-66.37	197.35	0.38	0.27	-1.11
1955.03	14.73	284.60	MWD	6	1931.88	188.12	-73.84	202.09	1.38	0.81	-4.56
1982.97	15.55	283.00	MWD	6	1958.85	189.86	-80.92	206.39	0.99	0.88	-1.72
2012.53	14.21	282.60	MWD	6	1987.41	191.54	-88.33	210.93	1.36	-1.36	-0.41
2041.92	12.34	285.00	MWD	6	2016.02	193.14	-94.88	215.19	1.99	-1.91	2.45
2071.47	10.96	285.00	MWD	6	2044.96	194.69	-100.64	219.16	1.40	-1.40	0.00
2100.72	8.87	285.50	MWD	6	2073.77	196.01	-105.50	222.60	2.15	-2.14	0.51
2130.28	6.72	285.10	MWD	6	2103.06	197.07	-109.37	225.38	2.18	-2.18	-0.41
2159.66	3.46	280.20	MWD	6	2132.32	197.67	-111.90	227.15	3.36	-3.33	-5.00
2189.18	0.25	276.80	MWD	6	2161.82	197.84	-112.84	227.76	3.26	-3.26	-3.46
2218.37	0.12	235.30	MWD	6	2191.01	197.83	-112.93	227.79	0.18	-0.13	-42.65
2246.97	0.04	212.10	MWD	6	2219.61	197.80	-112.96	227.79	0.09	-0.08	-24.34
2275.77	0.09	144.30	MWD	6	2248.41	197.78	-112.95	227.76	0.09	0.05	-70.63
2306.66	0.14	196.40	MWD	6	2279.30	197.72	-112.95	227.71	0.11	0.05	50.60
2336.73	0.09	193.30	MWD	6	2309.37	197.66	-112.97	227.67	0.05	-0.05	-3.09
2355.47	0.03	234.10	MWD	6	2328.11	197.65	-112.97	227.65	0.11	-0.10	65.31

HOLE DEVIATION

Well: 30/9-20 S **Reference point:** RKB ; 24.0 **m** ABOVE MSL

Waterdepth: 101.0 **m** **Vertical to:** 124.9 **m** **Total Depth:** 3124.0 **m MD**

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**

Wellhead Coordinates, UTM: **North :** 6686904.00 **m,** **East :** 489002.80 **m**

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
2412.44	0.28	235.10	MWD	6	2385.08	197.56	-113.10	227.64	0.13	0.13	0.53
2442.26	0.06	350.80	MWD	6	2414.90	197.53	-113.16	227.65	0.31	-0.22	116.40
2472.72	0.17	108.10	MWD	6	2445.36	197.53	-113.12	227.63	0.20	0.11	115.53
2501.56	0.44	43.80	MWD	6	2474.19	197.60	-113.00	227.63	0.41	0.28	-66.89
2530.21	0.61	35.20	MWD	6	2502.84	197.80	-112.84	227.73	0.20	0.18	-9.01
2560.73	0.57	29.00	MWD	6	2533.36	198.07	-112.67	227.87	0.07	-0.04	-6.09
2589.51	0.65	42.10	MWD	6	2562.14	198.31	-112.49	228.00	0.17	0.08	13.66
2620.94	0.86	71.50	MWD	6	2593.57	198.52	-112.15	228.01	0.41	0.20	28.06
2649.13	1.31	59.70	MWD	6	2621.75	198.75	-111.67	227.98	0.53	0.48	-12.56
2678.51	1.61	64.20	MWD	6	2651.12	199.10	-111.01	227.96	0.33	0.31	4.59
2709.05	2.16	61.80	MWD	6	2681.65	199.56	-110.12	227.92	0.55	0.54	-2.36
2737.82	2.02	58.00	MWD	6	2710.40	200.08	-109.21	227.95	0.21	-0.15	-3.96
2766.58	2.40	59.70	MWD	6	2739.14	200.66	-108.26	228.00	0.40	0.40	1.77
2796.78	2.39	52.80	MWD	6	2769.31	201.36	-107.21	228.12	0.29	-0.01	-6.85
2824.73	2.28	55.40	MWD	6	2797.24	202.02	-106.29	228.28	0.16	-0.12	2.79
2854.17	2.46	52.10	MWD	6	2826.65	202.75	-105.31	228.46	0.23	0.18	-3.36
2913.28	3.43	62.30	MWD	6	2885.68	204.35	-102.74	228.72	0.56	0.49	5.18
2941.75	3.98	66.10	MWD	6	2914.09	205.14	-101.09	228.70	0.63	0.58	4.00
2971.69	4.01	63.00	MWD	6	2943.96	206.04	-99.20	228.68	0.22	0.03	-3.11
3002.49	4.35	50.70	MWD	6	2974.68	207.27	-97.34	228.99	0.93	0.33	-11.98
3031.25	4.51	43.10	MWD	6	3003.35	208.78	-95.72	229.68	0.63	0.17	-7.93
3060.70	4.81	44.00	MWD	6	3032.71	210.52	-94.07	230.58	0.31	0.31	0.92
3090.42	5.83	63.40	MWD	6	3062.30	212.09	-91.86	231.13	2.07	1.03	19.58
3101.41	6.28	70.90	MWD	6	3073.23	212.54	-90.79	231.12	2.48	1.23	20.47

MAIN CONSUMPTION OF CASING/TUBING ON WELL 30/9-20 S PO: 1

Size	Casing string	Grade	Weight [kg/m]	Weight [lb/ft]	Threads type	Length [m]	No. of joints
30"	CONDUCTOR	X-52	460.86	309.70	SL-60	74.6	6
20"	SURFACE	X-56	197.92	133.00	E60MT	275.3	23
16"	INTERMEDIATE LINER	N-80	142.86	96.00	BUTTRESS	267.1	23
13 3/8"	INTERMEDIATE	L-80	107.14	72.00	NS-CC	1167.0	102
9 5/8"	PRODUCTION	P-110	79.61	53.50	NS-CC	2238.5	189

BITRECORD FOR WELL 30/9-20 S PO: 1

Bit No	RR	Type	Size (in)	Manu-fact-urer	Trade name	Serial no.	IADC code	Nozzles diameter (../32in)	Flow area (in2)	BHA no.	Depth out (m MD)	Bit meter (m)	Rot. hours (hrs)	ROP (m/hr)	Rotation min/max) (rpm)	Total bit revol.	Weight min/max (kN)	Flow min/max (l/min)	Pump min/max (bar)	Cutting Structure I - O -DC- L - B	Gauge 1/16 (in)	Other Remarks	Pull Cause
1		ISRT	17.50	SMIT	10GMODPD	8944	435	16,20,20,22	1.181	1	200	75	5.10	14.7		88000				1 - 1 - WT - A - E	I	NO	TD
		HO	36.00	DARR	TWOSTAGE	DOT39253		11,11,11,11,11,11	0.557	1	200	75		0.0						1 - 1 - WT - A - E		NO	
2		ISRT	9.88	SMIT	10MF	MG0476	437X	12,18,18,18	0.856	2	484	284	4.60	61.7	54/173	71000	10/110	2630/3098	73/103	1 - 1 - WT - A - E	I	NO	HP
3		ISRT	26.00	SMIT	M02SODC	LK4720	415	18,22,22,22	1.362	3	400	200	7.70	26.0	54/173	57000	10/140	2630/4323	73/149	1 - 2 - WT - A - E	I	NO	TD
4		MITO	17.00	SMIT	MSDGHC	MJ5658	135S	14,16,18,18	0.844	4	630	230	8.10	28.4	80/160	106000	40/120	3000/3780	120/200	1 - 1 - NO - A - E	I	NO	TD
		BN	11.00	.		C1940			0.000	5	623	223		0.0	63/170		20/130	2720/4350	92/235				
5		UR	8.00	REDB	STANDARDUR	42975		12,12,12,12	0.442	5	623	223	3.70	60.3	63/170	37000	20/130	2720/4350	92/235	1 - 1 - NO - A - E	I	NO	TD
		BN	8.00	.		1			0.000	6	402	37		0.0									
5		BIT	14.50	REED	STANDARD	A09686		16,16,16,16	0.785	7	626	30	2.50	12.0	80/80	13000	10/60	3500/3500	168/168				
5	1	MITO	14.50	SCHO	EMS11GC	A09686	115	16,16,16,16	0.785	8	1297	667	26.60	25.1	80/170	302	50/140	3500/4350	107/166	2 - 2 - WT - A - E	I	RR	TD
6		PDC	12.25	SMIT	MRS82PX	JS4526	M222	12,12,12,12,12,12	1.052	9	1454	157	3.10	50.6	78/190	71	0/50	2375/3680	155/265	- - - -			DTF
6	1	PDC	12.25	SMIT	MRS82PX	JS4526	M222	12,12,12,12,12,12	1.052	10	1596	142	24.50	5.8	60/190	136	10/220	3010/3635	210/300	- - - -			PR
7		ISRT	12.25	SMIT	15GFDPD	MJ0061	445	15,18,20,20	1.035	11	2369	773	35.20	22.0	70/190	274	20/290	2500/3390	170/320	1 - 2 - CT - H - E	I	BT	TD
8		PDC	8.50	SMIT	M36SPX	SC0405	M223	14,14,14,14	0.601	12	2791	422	14.90	28.3	65/314	367	30/110	1799/2145	215/306	1 - 1 - CT - A - X	I	NO	CP
9		COR	8.50	SDBS	FC274RILI	7000939			0.000	13	2827	36	2.10	17.1	107/310	17	10/70	999/2086	81/295	1 - 1 - NO - A - X	I	NO	TD
9		COR	8.50	SDBS	FC274RILI	7000939			0.000	14	2864	37	2.50	14.8	76/117	21	50/140	1006/1079	84/110	1 - 2 - NO - A - X	I	PN	TD
8	1	PDC	8.50	SMIT	M36SPX	SC0405	M223	14,14,14,14	0.601	15	3124	260	5.40	48.1	109/313	165	40/130	1047/2126	102/325	1 - 1 - CT - A - X	I	NO	TD

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-20 S PO: 1

BHA no. 1: No. / Element / OD(in) / Length(m) Depth In: 125 m MD Out: 200 m MD

1	10GMODPD	17.5	0.42	2	TWOSTAGE	36.0	3.38
3	BIT SUB	9.5	1.17	4	MWD	9.25	8.94
5	NON MAG. STAB	17.0	1.95	6	NON MAG. COLLAR	9.5	11.47
7	DRILL COLLAR STEEL	9.5	26.88	8	X-OVER	9.5	0.74
9	DRILL COLLAR STEEL	7.75	27.85	10	JAR	8.0	9.67
11	DRILL COLLAR STEEL	7.75	18.25	12	X-OVER	8.0	1.00

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 111.72

BHA no. 2: No. / Element / OD(in) / Length(m) Depth In: 200 m MD Out: 484 m MD

1	10MF	9.875	0.28	2	BIT SUB	8.0	1.24
3	CDR	8.75	6.69	4	MWD	8.25	8.92
5	NON MAG. STAB	9.875	2.32	6	NON MAG. COLLAR	7.95	17.66
7	DRILL COLLAR STEEL	8.0	55.27	8	JAR	8.0	9.67
9	DRILL COLLAR STEEL	8.0	18.25	10	X-OVER	8.0	1.00
11	HWDP	5.0	56.39				

Reason pulled: HOLE PROBLEMS Sum: 177.69

BHA no. 3: No. / Element / OD(in) / Length(m) Depth In: 200 m MD Out: 400 m MD

1	M02SODC	26.0	0.66	2	NEAR BIT STAB	26.0	2.46
3	NON MAG. COLLAR	9.0	2.94	4	NON MAG. STAB	26.0	2.19
5	MWD	9.25	8.94	6	NON MAG. COLLAR	9.5	17.51
7	DRILL COLLAR STEEL	9.5	26.88	8	X-OVER	9.5	0.74
9	DRILL COLLAR STEEL	8.0	27.85	10	JAR	8.0	9.67
11	DRILL COLLAR STEEL	8.0	18.25	12	X-OVER	8.0	1.00
13	HWDP	5.0	56.39				

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 175.48

BHA no. 4: No. / Element / OD(in) / Length(m) Depth In: 400 m MD Out: 630 m MD

1	MSDGHC	17.0	0.44	2	BIT SUB	9.5	1.17
3	CDR	9.5	7.27	4	MWD	9.25	8.46
5	NON MAG. STAB	17.0	1.95	6	NON MAG. COLLAR	9.5	17.43
7	DRILL COLLAR STEEL	9.5	26.88	8	X-OVER	9.5	0.74
9	DRILL COLLAR STEEL	8.0	27.85	10	JAR	8.0	9.67
11	DRILL COLLAR STEEL	8.0	18.25	12	X-OVER	8.0	1.00
13	HWDP	5.0	56.39				

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 177.50

BHA no. 5: No. / Element / OD(in) / Length(m) Depth In: 400 m MD Out: 623 m MD

1	BULL NOZE	11.0	0.80	2	X-OVER	9.5	0.68
3	STANDARDUR	8.0	3.80	4	BIT SUB	9.5	1.17
5	NON MAG. COLLAR	9.5	8.61	6	MWD	9.25	8.94
7	NON MAG. STAB	17.0	1.95	8	NON MAG. COLLAR	9.5	17.43
9	DRILL COLLAR STEEL	9.5	26.88	10	X-OVER	9.5	0.74
11	DRILL COLLAR STEEL	8.0	27.85	12	JAR	8.0	9.67
13	DRILL COLLAR STEEL	8.0	8.99	14	X-OVER	8.0	1.20
15	HWDP	5.0	56.39				

Reason pulled: Sum: 175.10

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-20 S PO: 1

BHA no. 6: No. / Element / OD(in) / Length(m) Depth In: 365 m MD Out: 402 m MD

1	BULL NOZE	11.0	0.80	2	X-OVER	9.375	0.68
3	NON MAG. STAB	17.0	1.95	4	STANDARDUR	17.5	3.15
5	BIT SUB	7.94	0.94	6	DRILL COLLAR STEEL	8.0	55.27
7	JAR	8.0	9.67	8	DRILL COLLAR STEEL	8.0	18.14
9	X-OVER	8.0	1.20	10	HWDP	5.0	56.39

Reason pulled: Sum: 148.19

BHA no. 7: No. / Element / OD(in) / Length(m) Depth In: 596 m MD Out: 626 m MD

1	STANDARD	14.5	0.38	2	BIT SUB	8.0	1.23
3	DRILL COLLAR STEEL	8.0	55.27	4	JAR	8.0	9.67
5	DRILL COLLAR STEEL	8.0	18.14	6	X-OVER	8.0	1.20
7	HWDP	5.0	56.39				

Reason pulled: Sum: 142.28

BHA no. 8: No. / Element / OD(in) / Length(m) Depth In: 630 m MD Out: 1297 m MD

1	EMS11GC	14.5	0.38	2	X-OVER	9.38	0.68
3	STANDARDUR	17.5	3.15	4	X-OVER	9.5	1.18
5	CDR	9.625	7.27	6	MWD	9.25	8.46
7	NON MAG. COLLAR	9.5	8.53	8	NON MAG. COLLAR	9.5	8.90
9	DRILL COLLAR STEEL	9.5	8.96	10	DRILL COLLAR STEEL	9.5	9.24
11	DRILL COLLAR STEEL	9.5	8.68	12	X-OVER	9.375	0.74
13	DRILL COLLAR STEEL	7.813	9.24	14	DRILL COLLAR STEEL	7.813	9.30
15	DRILL COLLAR STEEL	7.813	9.31	16	JAR	7.938	9.67
17	DRILL COLLAR STEEL	7.75	8.78	18	DRILL COLLAR STEEL	7.75	9.36
19	X-OVER	6.5	1.20	20	HWDP	5.0	56.39

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 179.42

BHA no. 9: No. / Element / OD(in) / Length(m) Depth In: 1297 m MD Out: 1454 m MD

1	MRS82PX	12.25	0.34	2	POWER DRIVE	12.125	9.19
3	MWD	8.25	8.78	4	CDR	8.25	6.84
5	NON MAG. COLLAR	8.0	9.16	6	DRILL COLLAR STEEL	8.0	9.24
7	DRILL COLLAR STEEL	8.0	9.37	8	DRILL COLLAR STEEL	8.0	9.27
9	DRILL COLLAR STEEL	8.0	9.27	10	DRILL COLLAR STEEL	8.0	9.22
11	DRILL COLLAR STEEL	8.0	9.17	12	JAR	7.938	9.67
13	DRILL COLLAR STEEL	8.0	9.30	14	DRILL COLLAR STEEL	8.0	9.36
15	HWDP	5.0	56.39				

Reason pulled: DOWNHOLE TOOL FAILURE Sum: 174.57

BHA no. 10: No. / Element / OD(in) / Length(m) Depth In: 1454 m MD Out: 1596 m MD

1	MRS82PX	12.25	0.34	2	OTHER	12.125	9.22
3	MWD	8.25	8.78	4	CDR	8.25	6.84
5	NON MAG. COLLAR	8.0	9.16	6	DRILL COLLAR STEEL	8.0	9.24
7	DRILL COLLAR STEEL	8.0	9.37	8	DRILL COLLAR STEEL	8.0	9.27
9	DRILL COLLAR STEEL	8.0	9.27	10	DRILL COLLAR STEEL	8.0	9.22
11	DRILL COLLAR STEEL	8.0	9.17	12	JAR	7.938	9.67
13	DRILL COLLAR STEEL	8.0	9.30	14	DRILL COLLAR STEEL	8.0	9.36
15	HWDP	5.0	56.39				

Reason pulled: PENETRATION RATE Sum: 174.60

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-20 S PO: 1

BHA no. 11: No. / Element / OD(in) / Length(m) Depth In: 1596 m MD Out: 2369 m MD

1	15GFDPD	12.25	0.29	2	POWER DRIVE	12.125	9.21
3	MWD	8.25	8.78	4	CDR	8.25	6.84
5	NON MAG. COLLAR	8.0	9.16	6	DRILL COLLAR STEEL	7.813	9.24
7	DRILL COLLAR STEEL	7.813	9.30	8	DRILL COLLAR STEEL	7.688	8.88
9	DRILL COLLAR STEEL	7.75	9.09	10	DRILL COLLAR STEEL	7.813	9.18
11	DRILL COLLAR STEEL	7.75	9.10	12	DRILL COLLAR STEEL	7.75	9.02
13	DRILL COLLAR STEEL	7.813	9.36	14	DRILL COLLAR STEEL	7.813	9.31
15	DRILL COLLAR STEEL	7.813	9.08	16	DRILL COLLAR STEEL	7.75	9.39
17	DRILL COLLAR STEEL	7.75	9.17	18	JAR	7.938	9.67
19	DRILL COLLAR STEEL	7.75	8.99	20	DRILL COLLAR STEEL	7.813	9.15
21	HWDP	5.0	56.39				

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 228.60

BHA no. 12: No. / Element / OD(in) / Length(m) Depth In: 2369 m MD Out: 2791 m MD

1	M36SPX	8.5	0.28	2	DOWN HOLE MOTOR WITH STA	8.375	7.65
3	LOGGING WHILE DRILLING TOOL	8.325	3.45	4	LOGGING WHILE DRILLING TO(	6.75	5.67
5	MWD	6.75	8.22	6	LOGGING WHILE DRILLING TO(	8.25	6.08
7	NON MAG. COLLAR	6.56	8.47	8	DRILL COLLAR STEEL	6.5	9.46
9	DRILL COLLAR STEEL	6.562	9.46	10	DRILL COLLAR STEEL	6.5	9.47
11	DRILL COLLAR STEEL	6.5	9.46	12	DRILL COLLAR STEEL	6.5	9.37
13	DRILL COLLAR STEEL	6.375	9.35	14	DRILL COLLAR STEEL	6.5	9.45
15	DRILL COLLAR STEEL	6.5	9.47	16	JAR	6.5	9.67
17	DRILL COLLAR STEEL	6.5	9.46	18	DRILL COLLAR STEEL	6.5	9.47
19	HWDP	5.0	140.85				

Reason pulled: CORE POINT Sum: 284.76

BHA no. 13: No. / Element / OD(in) / Length(m) Depth In: 2791 m MD Out: 2827 m MD

1	FC274RILI	8.5	0.36	2	CORE BARREL	8.47	39.23
3	FLOAT SUB	6.75	0.93	4	DRILL COLLAR STEEL	6.5	9.47
5	NON MAG. STAB	8.375	1.65	6	DRILL COLLAR STEEL	6.5	9.46
7	DRILL COLLAR STEEL	6.5	9.37	8	DRILL COLLAR STEEL	6.375	9.35
9	DRILL COLLAR STEEL	6.5	9.45	10	DRILL COLLAR STEEL	6.5	9.47
11	JAR	6.5	9.67	12	DRILL COLLAR STEEL	6.5	9.46
13	DRILL COLLAR STEEL	6.5	9.47	14	HWDP	5.0	140.85

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 268.19

BHA no. 14: No. / Element / OD(in) / Length(m) Depth In: 2827 m MD Out: 2864 m MD

1	FC274RILI	8.5	0.36	2	CORE BARREL	8.47	39.23
3	FLOAT SUB	6.75	0.93	4	DRILL COLLAR STEEL	6.5	9.47
5	NON MAG. STAB	8.375	1.65	6	DRILL COLLAR STEEL	6.5	9.46
7	DRILL COLLAR STEEL	6.5	9.37	8	DRILL COLLAR STEEL	6.375	9.35
9	DRILL COLLAR STEEL	6.5	9.45	10	DRILL COLLAR STEEL	6.5	9.47
11	JAR	6.5	9.67	12	DRILL COLLAR STEEL	6.5	9.46
13	DRILL COLLAR STEEL	6.5	9.47	14	HWDP	5.0	140.85

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 268.19

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-20 S PO: 1

BHA no. 15: No. / Element / OD(in) / Length(m) Depth In: 2864 m MD Out: 3124 m MD

1	M36SPX	8.5	0.28	2	DOWN HOLE MOTOR WITH STA	8.375	7.65
3	LOGGING WHILE DRILLING TOOL	8.325	3.45	4	LOGGING WHILE DRILLING TO(	6.75	5.67
5	MWD	6.75	8.22	6	LOGGING WHILE DRILLING TO(	8.25	6.08
7	NON MAG. COLLAR	6.56	8.47	8	DRILL COLLAR STEEL	6.5	9.46
9	DRILL COLLAR STEEL	6.562	9.46	10	DRILL COLLAR STEEL	6.5	9.47
11	DRILL COLLAR STEEL	6.5	9.46	12	DRILL COLLAR STEEL	6.5	9.37
13	DRILL COLLAR STEEL	6.375	9.35	14	DRILL COLLAR STEEL	6.5	9.45
15	DRILL COLLAR STEEL	6.5	9.47	16	JAR	6.5	9.67
17	DRILL COLLAR STEEL	6.5	9.46	18	DRILL COLLAR STEEL	6.5	9.47
19	HWDP	5.0	140.85				

Reason pulled: TOTAL DEPTH/CASING DEPTI Sum: 284.76

BHA no. 16: No. / Element / OD(in) / Length(m) Depth In: 392 m MD Out: 392 m MD

1	EXTERNAL CUTTER	8.25	0.94	2	OTHER		1.84
3	DRILL PIPE	5.0	265.18	4	X-OVER	8.0	0.91
5	OTHER	13.875	1.54	6	X-OVER	8.0	1.01
7	DRILL PIPE	5.0	119.95				

Reason pulled: Sum: 389.53

BHA no. 17: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

2	SPEAR PACK OFF	6.063	0.81	3	SPEAR	8.188	1.47
4	STOP SUB	8.0	1.08	5	BUMPER SUB	8.0	1.58
6	DRILL COLLAR STEEL	8.0	18.54	7	X-OVER	8.0	0.86

Reason pulled: Sum: 24.34

BHA no. 18: No. / Element / OD(in) / Length(m) Depth In: 364 m MD Out: 364 m MD

1	EXTERNAL CUTTER	11.75	2.81	2	X-OVER	8.0	0.58
3	DRILL PIPE	5.0	235.69	4	X-OVER	8.0	0.46
5	OTHER	13.875	0.88	6	X-OVER	8.0	0.49
7	DRILL PIPE	5.0	121.37				

Reason pulled: Sum: 362.28

BHA no. 19: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

2	SPEAR PACK OFF	6.375	1.35	3	SPEAR	8.188	1.47
5	BUMPER SUB	8.0	1.58	6	DRILL COLLAR STEEL	8.0	18.54

Reason pulled: Sum: 22.94

BHA no. 20: No. / Element / OD(in) / Length(m) Depth In: 195 m MD Out: 195 m MD

1	MGSS+2C	17.5	0.46	2	BIT SUB	9.5	1.18
3	DRILL COLLAR STEEL	8.0	27.64	4	X-OVER	8.0	1.20

Reason pulled: Sum: 30.48

BHA no. 21: No. / Element / OD(in) / Length(m) Depth In: 130 m MD Out: 130 m MD

1	NEAR BIT STAB	12.25	1.78	2	CASING CUTTER	7.75	2.98
3	OTHER	17.5	0.90	4	OTHER	7.75	0.52
5	OTHER	9.438	8.16	6	BUMPER SUB	8.0	1.58
7	X-OVER						

Reason pulled: Sum: 15.92

CEMENT SLURRY REPORT ON WELL 30/9-20 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
09-01-02	30"	CASING CEMENTING	LEAD	23.00	1.56	8.00	129.60	FP-14L	l	0.20	
								A-3L	l	3.50	
			TAIL SLURRY	23.00	1.95	8.00	74.73	FP-14L	l	0.20	
								A-7L	l	3.50	
			DISPLACEMENT	5.50	0.00	8.00					
			DISPLACEMENT			8.00					
11-01-02	UNDEFINED	PLUG IN OPEN HOLE	TAIL SLURRY	1.70	1.90	30.00	81.66	FP-14L	l	0.20	
								CD-31L	l	0.60	
								R-12L	l	0.30	
								FL-45L	l	6.50	
								MICRO	l	10.50	
			DISPLACEMENT	3.60	1.50	30.00					
			DISPLACEMENT			30.00					
12-01-02	20"	CASING CEMENTING	LEAD	63.00	1.44	21.00	168.53	A-3L	l	5.30	
								FP-14L	l	0.20	
			TAIL SLURRY	23.00	1.92	21.00	76.77	FP-14L	l	0.20	
								A-7L	l	2.00	
			DISPLACEMENT			21.00					
16-01-02	16"	LINER CEMENTING	LEAD	13.50	1.50	27.00	169.48	R-12L	l	0.30	
								FL-45L	l	12.00	
								FP-14L	l	0.60	
								CD-31L	l	1.10	
								MICRO	l	38.00	
			TAIL SLURRY	10.00	1.90	27.00	81.66	CD-31L	l	0.60	
								FL-45L	l	6.50	
								FP-14L	l	0.20	
								MICRO	l	10.50	
								R-12L	l	0.30	
			DISPLACEMENT			27.00					
19-01-02	13 3/8"	CASING CEMENTING	TAIL SLURRY	27.80	1.92	37.00	75.07	FP-14L	l	0.20	
								R-12L	l	0.65	
			DISPLACEMENT		1.30	37.00					

CEMENT SLURRY REPORT ON WELL 30/9-20 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
19-01-02	13 3/8"	CASING CEMENTING	DISPLACEMENT			37.00					
25-01-02	9 5/8"	CASING CEMENTING	SPACER	15.00	1.70	59.00		BARITC	kg		909.00
								FP-14L	l		10.00
								MCS-G	l		104.00
			TAIL SLURRY	13.40	1.90	59.00	78.64	CD-31L	l	0.40	
								FP-14L	l	0.20	
								MICRO	l	4.00	
								R-12L	l	0.85	
			DISPLACEMENT	82.00	1.45	59.00					
			DISPLACEMENT			59.00					
03-02-02	20"	PLUG IN CASED HOLE	TAIL SLURRY	33.00	1.65	20.00		FP-14L	l	0.20	
			DISPLACEMENT	1.00	1.50	20.00	106.77				
			DISPLACEMENT			20.00					
	9 5/8"	PLUG IN CASED TO OPEN HOLE	SPACER	5.50	1.65	81.00		BARITC	kg		844.00
								FP-14L	l		10.00
								MCS-G	l		104.00
			TAIL SLURRY	9.00	1.90	81.00	78.22	FP-14L	l	0.20	
								MICRO	l	0.90	
								R-12L	l	2.00	
			DISPLACEMENT	17.30	1.30	81.00					
			DISPLACEMENT			81.00					
		PLUG IN OPEN HOLE	SPACER	0.00	1.65	107.00		BARITC	kg		844.00
								FP-14L	l		10.00
								MCS-G	l		104.00
			TAIL SLURRY	11.00	1.50	107.00	106.77	CD-31L	l	2.00	
								FL-45L	l	2.50	
								FP-14L	l	0.20	
								MICRO	l	11.00	

Norsk Hydro

08-08-02

CEMENT SLURRY REPORT ON WELL 30/9-20 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
03-02-02	9 5/8"	PLUG IN OPEN HOLE	TAIL SLURRY	11.00	1.50	107.00	106.77	R-15L	l	0.90	
			DISPLACEMENT	22.00		107.00					
			DISPLACEMENT			107.00					
03-02-02	9 5/8"	PLUG IN OPEN HOLE	SPACER	5.50	1.65	107.00		BARITC	kg		844.00
								FP-14L	l		10.00
								MCS-G	l		104.00
			TAIL SLURRY	11.00	1.50	107.00	106.77	CD-31L	l	2.00	
								FL-45L	l	2.50	
								FP-14L	l	0.20	
								MICRO	l	11.00	
								R-15L	l	0.90	
			DISPLACEMENT	22.00		107.00					
			DISPLACEMENT			107.00					

CEMENT CONSUMPTION PER JOB ON WELL 30/9-20 S PO: 1

Date	CsgSize	Job Type	Cement/ Additive	Description	Unit	Actual Amount Used
09-01-02	30"	CASING CEMENTING	A-3L	EXTENDER: LIQUID LODENSE	l	430
			A-7L	ACCELERATOR: LIQUID CACL2	l	-759
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	159
			G	API CLASS G	MT	46
11-01-02	NDEFINE	PLUG IN OPEN HOLE	CD-31L	DISPERSANT: CD-31L LIQUID	l	21
			G	API CLASS G	MT	3
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 D	l	10
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	373
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	7
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEG	l	231
12-01-02	20"	CASING CEMENTING	A-3L	EXTENDER: LIQUID LODENSE	l	2146
			A-7L	ACCELERATOR: LIQUID CACL2	l	632
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	141
			G	API CLASS G	MT	73
16-01-02	16"	LINER CEMENTING	CD-31L	DISPERSANT: CD-31L LIQUID	l	176
			G	API CLASS G	MT	20
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	4800
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 D	l	66
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	71
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEG	l	1964
19-01-02	13 3/8"	CASING CEMENTING	FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	74
			G	API CLASS G	MT	35
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 D	l	241
25-01-02	9 5/8"	CASING CEMENTING	CD-31L	DISPERSANT: CD-31L LIQUID	l	78
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	195
			G	API CLASS G	MT	17
			MCS-G	SPACER ADDITIVE: MCS-G	l	1500
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	700
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 D	l	160
03-02-02	20"	PLUG IN CASED HOLE	D-8	SPECIAL ADDITIVE: SILICA FLUOR, TEMP. TO 204 I	kg	17
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	85
			G	API CLASS G	MT	30
	9 5/8"	PLUG IN CASED TO OPEN HOLE	FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	83
			G	API CLASS G	MT	12
			MCS-G	SPACER ADDITIVE: MCS-G	l	624
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	700
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 D	l	202
	9 5/8"	PLUG IN OPEN HOLE	CD-31L	DISPERSANT: CD-31L LIQUID	l	232
			D-8	SPECIAL ADDITIVE: SILICA FLUOR, TEMP. TO 204 I	kg	16
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEG	l	288
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	71
			MCS-G	SPACER ADDITIVE: MCS-G	l	624
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	1264
			R-15L	RETARDER: HIGH TEMP. BETWEEN 93 AND 149 DE	l	104
03-02-02	9 5/8"	PLUG IN OPEN HOLE	CD-31L	DISPERSANT: CD-31L LIQUID	l	232
			D-8	SPECIAL ADDITIVE: SILICA FLUOR, TEMP. TO 204 I	kg	16
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEG	l	288
			FP-14L	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	71
			MCS-G	SPACER ADDITIVE: MCS-G	l	624
			MICRO	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGF	l	1264
			R-15L	RETARDER: HIGH TEMP. BETWEEN 93 AND 149 DE	l	104

TOTAL CONSUMPTION OF CEMENT ADDITIVES ON WELL 30/9-20 S PO: 1

Section	Cement/Additive	Unit	Total Amount Used
36"	ACCELERATOR: LIQUID CACL2	l	-759.00
	EXTENDER: LIQUID LODENSE	l	430.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	159.00
	API CLASS G	MT	46.00
26"	API CLASS G	MT	73.00
	ACCELERATOR: LIQUID CACL2	l	632.00
	EXTENDER: LIQUID LODENSE	l	2146.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	141.00
20"	DISPERSANT: CD-31L LIQUID	l	176.00
	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	1964.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	71.00
	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	66.00
	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGRATION	l	4800.00
	API CLASS G	MT	20.00
17"	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	241.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	74.00
	API CLASS G	MT	35.00
12 1/4"	DISPERSANT: CD-31L LIQUID	l	78.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	195.00
	API CLASS G	MT	17.00
	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGRATION	l	700.00
	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	160.00
	SPACER ADDITIVE: MCS-G	l	1500.00
9 7/8"	API CLASS G	MT	3.00
	DISPERSANT: CD-31L LIQUID	l	21.00
	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	231.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	7.00
	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGRATION	l	373.00
	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	10.00
8 1/2"	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	225.00
	API CLASS G	MT	12.00
	SPACER ADDITIVE: MCS-G	l	1872.00
	SPECIAL ADDITIVE: MICROBLOCK, ANTI GAS MIGRATION	l	3228.00
	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	202.00
	RETARDER: HIGH TEMP. BETWEEN 93 AND 149 DEGC	l	208.00
	DISPERSANT: CD-31L LIQUID	l	464.00
	SPECIAL ADDITIVE: SILICA FLUOR, TEMP. TO 204 DEGC	kg	32.00
	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	576.00
0.0	SPECIAL ADDITIVE: SILICA FLUOR, TEMP. TO 204 DEGC	kg	17.00
	SPECIAL ADDITIVE: DEFOAMER FP-14L	l	85.00
	API CLASS G	MT	30.00

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 30/9-20 S PO: 1

Hole section : 36" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-09	198	198	SPUD MUD	107.0	1.03		0	0	0	0	0	0	0	0					

Hole section : 9 7/8" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-10 22:00	484	484	SPUD MUD	115.0	1.03		0	0	0	0	0	0	0	0					

Hole section : 26" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-11 18:00	484	484	SPUD MUD	110.0	1.03		0	0	0	0	0	0	0	0					
2002-01-12 06:00	400	400	SPUD MUD	80.0	1.50		0	0	0	0	0	0	0	0					
2002-01-13 20:00	400	400	SPUD MUD	80.0	1.50		0	0	0	0	0	0	0	0					
2002-01-14	600	600	KCL/POLYMER	68.0	1.30		71	51	42	32	0	0	11	9	50.0	20.0	15.5	5.0	12.0

Hole section : 20" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-15 23:00	623	623	KCL/POLYMER	71.0	1.30	31.0	70	50	40	32	0	0	12	10	50.0	20.0	15.0	5.0	11.0
2002-01-16 20:00	623	623	KCL/POLYMER	70.0	1.31		76	54	44	37	0	0	13	11	50.0	22.0	16.0	6.0	14.0

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-17 22:30	870	869	KCL/POLYMER	64.0	1.22		56	39	33	25	0	0	11	10	50.0	17.0	11.0	5.0	6.0
2002-01-18 23:00	1297	1292	KCL/POLYMER	62.0	1.21		56	41	35	27	0	0	10	9	50.0	15.0	13.0	5.0	7.5
2002-01-19 12:00	1297	1292	KCL/POLYMER	62.0	1.21		56	41	35	27	0	0	10	9	50.0	15.0	13.0	5.0	8.0

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 30/9-20 S PO: 1

Hole section : 17 1/2" **OIL BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-20	1304	1299	VERSAVERT		1.20		68	42	32	21	0	0	9	8	50.0	26.0	8.0	6.0	8.0

Hole section : 12 1/4" **OIL BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-21 23:00	1585	1571	VERSAVERT	66.0	1.45		98	62	48	34	0	0	13	12	50.0	36.0	13.0	7.0	9.0
2002-01-22 22:00	1596	1582	VERSAVERT		1.45		95	60	48	33	0	0	13	12	50.0	35.0	12.5	7.0	9.0
2002-01-23 22:00	2128	2101	VERSAVERT	84.0	1.45	49.0	99	62	48	33	0	0	12	11	50.0	37.0	12.5	7.0	9.5
2002-01-24 21:30	2369	2342	VERSAVERT	89.0	1.45	50.0	96	59	45	31	0	0	11	10	50.0	37.0	11.0	6.5	9.0
2002-01-25 21:30	2369	2342	VERSAVERT	89.0	1.45	50.0	96	59	45	31	0	0	11	10	50.0	37.0	11.0	7.0	9.0

Hole section : 8 1/2" **OIL BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-01-26 23:00	2370	2343	VERSAVERT	80.0	1.30	32.0	74	43	32	21	0	0	7	6	50.0	31.0	6.0	5.0	7.0
2002-01-27 21:00	2790	2763	VERSAVERT		1.30	42.0	76	47	36	25	0	0	10	9	50.0	29.0	9.0	6.0	7.5
2002-01-28 22:00	2827	2800	VERSAVERT		1.30	29.0	76	48	37	25	0	0	10	9	50.0	28.0	10.0	5.8	7.3
2002-01-29 22:00	2864	2836	VERSAVERT		1.30	29.0	73	45	35	24	0	0	10	9	50.0	28.0	8.5	6.0	7.5
2002-01-30 22:30	3124	3096	VERSAVERT	90.0	1.30	32.0	78	50	39	28	0	0	12	11	50.0	28.0	11.0	7.0	8.5
2002-01-31 22:00	3124	3096	VERSAVERT	99.0	1.30	30.0	75	48	37	25	0	0	12	11	50.0	27.0	10.5	6.5	9.0
2002-02-01 23:59	3124	3096	VERSAVERT	100.0	1.30	10.0	80	50	41	28	0	0	12	11	50.0	30.0	10.0	7.0	9.0

Hole section : P&A **OIL BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-02-02 23:59	3124	3096	VERSAVERT	100.0	1.30	10.0	81	50	42	28	0	0	12	10	50.0	31.0	9.5	8.0	10.0
2002-02-03 23:59	1000	999	VERSAVERT	100.0	1.30	10.0	82	51	42	29	0	0	12	10	50.0	31.0	10.0	10.0	8.0
2002-02-05		0	VERSAVERT				0	0	0	0	0	0	0	0					

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/9-20 S PO: 1

Hole section : 36" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-01-09	198	198	SPUD MUD	1.03					/																

Hole section : 9 7/8" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-01-10 22:00	484	484	SPUD MUD	1.03					/																

Hole section : 26" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-01-11 18:00	484	484	SPUD MUD	1.03					/																
2002-01-12 06:00	400	400	SPUD MUD	1.50					/																
2002-01-13 20:00	400	400	SPUD MUD	1.50					/																
2002-01-14	600	600	KCL/POLYMER	1.30	3.2		1		/	8.4		0.0	1.7			95000	600		600	15.0	4.0	0.3	14	3.4	137

Hole section : 20" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-01-15 23:00	623	623	KCL/POLYMER	1.30	3.2		1		/	8.7		0.1	1.8		94	94000	560		560	15.0	3.2		21	3.3	151
2002-01-16 20:00	623	623	KCL/POLYMER	1.31	3.8		1		/	10.2		0.3	2.2		94	94000	1200		1200	16.0	3.2	0.3	21	3.2	188

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-01-17 22:30	870	869	KCL/POLYMER	1.22	3.4		1		/	9.1		0.2	1.8		93	94000	960		960	13.5	4.0	1.0	10	2.9	190
2002-01-18 23:00	1297	1292	KCL/POLYMER	1.21	3.4		1		/	8.3		0.0	1.4		992	92000	600		600	14.0	4.0	1.0		2.7	235
2002-01-19 12:00	1297	1292	KCL/POLYMER	1.21	3.4		1		/	8.3		0.0	1.4		992	92000	600		600	14.0	4.0	1.0	10	2.7	235

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/9-20 S PO: 1

Hole section : 17 1/2" **OIL BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Density [sg]	Filtrate HPHT [ml]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	Electrical stability [V]	Alcalinity Pm [ml]	CaCl2 [mg/l]	Oil/Water Ratio	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	ASG [sg]	LGS [Kg/m3]
2002-01-20	1304	1299	VERSAVERT	1.20	4.0	2	/ 150	400		122	70/ 30	12.0	62.0	0.0	3.6	89

Hole section : 12 1/4" **OIL BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Density [sg]	Filtrate HPHT [ml]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	Electrical stability [V]	Alcalinity Pm [ml]	CaCl2 [mg/l]	Oil/Water Ratio	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	ASG [sg]	LGS [Kg/m3]
2002-01-21 23:00	1585	1571	VERSAVERT	1.45	2.8	2	/	829		200	71/ 29	20.0	57.0	0.3	3.8	107
2002-01-22 22:00	1596	1582	VERSAVERT	1.45	3.0	1	/	945		200	71/ 29	20.0	57.0	0.3	3.8	107
2002-01-23 22:00	2128	2101	VERSAVERT	1.45	2.8	1	/	888		203	72/ 28	22.0	56.0	0.5	3.5	194
2002-01-24 21:30	2369	2342	VERSAVERT	1.45	2.4	1	/	832		209	72/ 28	22.0	56.0	0.5	3.5	194
2002-01-25 21:30	2369	2342	VERSAVERT	1.45	2.4	1	/	832		209	72/ 28	22.0	56.0	0.5	3.5	194

Hole section : 8 1/2" **OIL BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Density [sg]	Filtrate HPHT [ml]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	Electrical stability [V]	Alcalinity Pm [ml]	CaCl2 [mg/l]	Oil/Water Ratio	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	ASG [sg]	LGS [Kg/m3]
2002-01-26 23:00	2370	2343	VERSAVERT	1.30	3.2	2	/	523		166	69/ 31	14.0	59.0	0.5	3.9	48
2002-01-27 21:00	2790	2763	VERSAVERT	1.30	1.8	2	/	778		209	73/ 27	17.4	60.6	0.5	3.3	186
2002-01-28 22:00	2827	2800	VERSAVERT	1.30	2.4	1	/	727		204	71/ 29	16.0	60.0	0.5	3.5	128
2002-01-29 22:00	2864	2836	VERSAVERT	1.30	2.6	1	/	1773		205	75/ 25	16.2	62.8	0.5	3.6	130
2002-01-30 22:30	3124	3096	VERSAVERT	1.30	3.8	2	/	837		210	75/ 25	17.5	62.0	0.5	3.3	187
2002-01-31 22:00	3124	3096	VERSAVERT	1.30	2.6	1	/	837		206	76/ 24	17.5	62.0	0.3	3.3	187
2002-02-01 23:59	3124	3096	VERSAVERT	1.30	2.4	1	/ 100	850		787	75/ 25	17.5	62.0	0.2	3.6	90

Hole section : P&A **OIL BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Density [sg]	Filtrate HPHT [ml]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	Electrical stability [V]	Alcalinity Pm [ml]	CaCl2 [mg/l]	Oil/Water Ratio	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	ASG [sg]	LGS [Kg/m3]
2002-02-02 23:59	3124	3096	VERSAVERT	1.30	2.5	1	/ 100	850		802	75/ 25	17.5	62.0	0.2	3.6	85
2002-02-03 23:59	1000	999	VERSAVERT	1.30	3.0	18	/ 100	750		796	76/ 24	18.0	62.0	0.3	3.4	111
2002-02-05		0	VERSAVERT				/				/					

TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 30/9-20 S PO: 1

Section	Product/ Additive	Unit	Total Amount Used
36"	BENTONITE	kg	1000.00
	CMC EHV	kg	25.00
26"	BARITE	kg	125000.00
	BENTONITE	kg	15000.00
	CMC EHV	kg	675.00
	DEFOAMER	l	50.00
	SODA ASH	kg	100.00
20"	BARITE	kg	15000.00
	DUOTEC NS	kg	100.00
17 1/2"	CELPOL ESL	kg	5950.00
	CITRIC ACID	kg	1175.00
	DEFOAMER	l	25.00
	DUOTEC NS	kg	1925.00
	GLYCOL	l	4500.00
	KCL	kg	4000.00
	KCL BRINE	l	312000.00
	POTASSIUM CARBONATE	kg	250.00
	SODIUM BICARBONATE	kg	500.00
17"	BARITE	kg	55000.00
	CITRIC ACID	kg	700.00
	DUOTEC NS	kg	100.00
	SODIUM BICARBONATE	kg	700.00
12 1/4"	BARITE	kg	100000.00
	CACL2 BRINE (1.38 SG)	l	13000.00
	CALCIUM CHLORIDE	kg	500.00
	EDC 95/11	l	97000.00
	LIME	kg	5400.00
	VERSAVERT F	l	500.00
	VERSAVERT PE	l	6000.00
	VERSAVERT SE	l	4690.00
	VERSAVERT VIS	kg	2500.00
9 7/8"	BARITE	kg	127000.00
	BENTONITE	kg	12000.00
	CMC EHV	kg	325.00
	DUOTEC NS	kg	450.00
	KCL BRINE	l	76000.00
	SODA ASH	kg	100.00
8 1/2"	BARITE	kg	55000.00
	CMC EHV	kg	575.00
	DEFOAMER	l	50.00
	DUOTEC NS	kg	50.00
	EDC 95/11	l	41000.00
	LIME	kg	220.00
	NUTPLUG M	kg	75.00
	POTASSIUM CARBONATE	kg	550.00
	SODA ASH	kg	25.00
	VERSAVERT F	l	500.00

TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 30/9-20 S PO: 1

Section	Product/ Additive	Unit	Total Amount Used
8 1/2"	VERSAVERT PE	l	2000.00
	VERSAVERT SE	l	1150.00
	VERSAVERT VIS	kg	2525.00
0.0	BARITE	kg	105000.00
	BENTONITE	kg	4000.00
	CMC EHV	kg	250.00
	DUOTEC NS	kg	100.00
	SODA ASH	kg	50.00

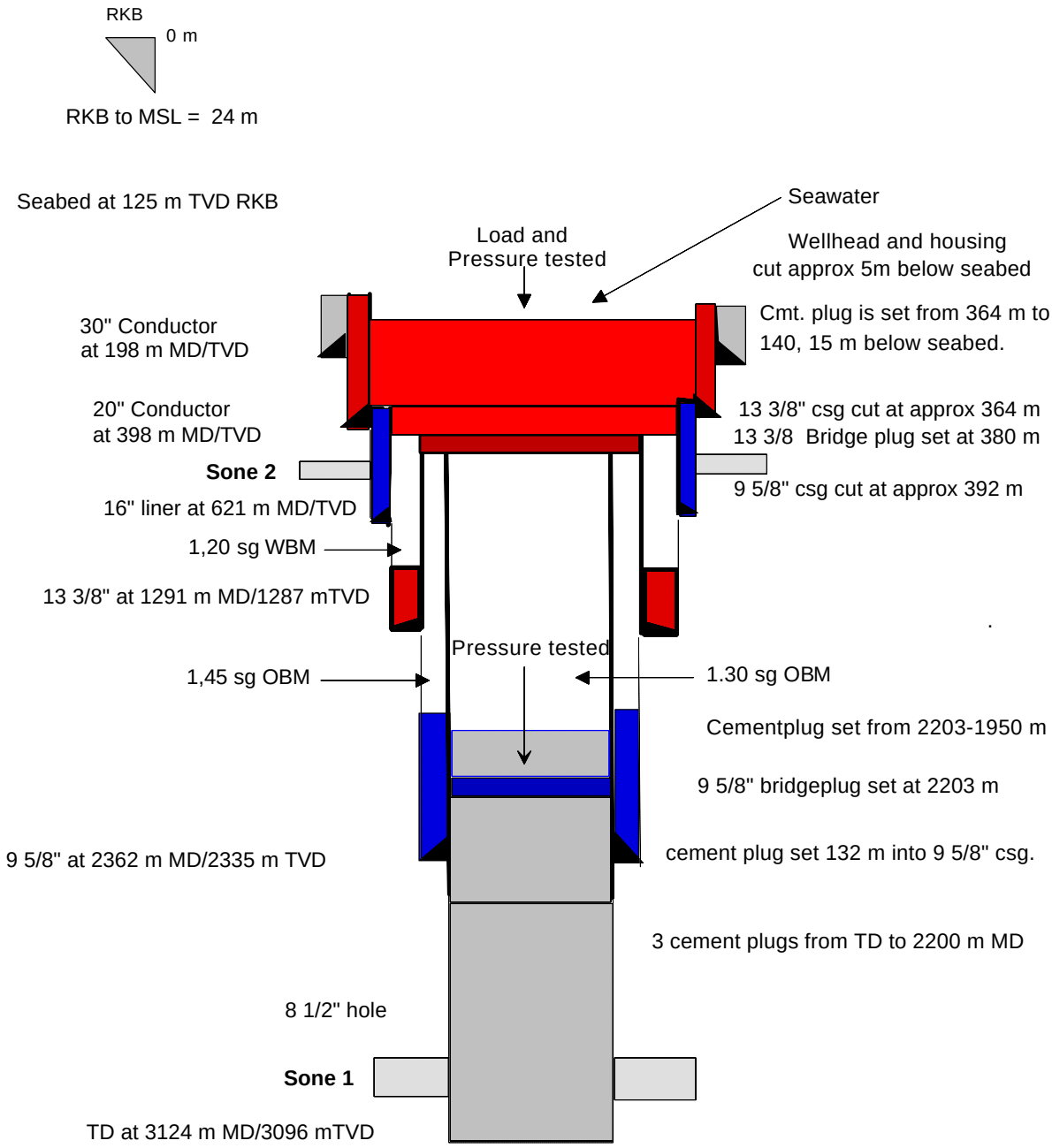
LOGGING INFORMATION ON WELL 30/9-20 S

Hole size: 8 1/2"

#	Run No.	Logging Company	Logged Bottom [m MD]	Logged Top [m MD]	Log Suite
1	1A		3124	2362	AIT/IPLT
2	1A		2975	2747	GR/MSCT
3	1A		3124	2040	GR/VSP
4	1A		2934.5	2798.5	GR/MDT
5	1A		3124	2000	GR/DSI/OBDT

LEAK OFF TEST ON WELL 30/9-20 S

m MD RKB/ m TVD RKB	Section	Date	Mudtype	Mudweight SG	LOT SG
401/ 401	20"	14-01-2002	SeaWater	1.03	FIT 1.5
1300 / 1295.1	12,25"	20-01-2002	Water Based Mud	1.2	1.68
2372.0/ 2344.6	8.5"	27-01-2002	Oil Base Mud	1.3	FIT 1.6



Plug and Abandonment Program Well 30/9-20 S	**Fig. B-1.1** **Revision: 5**	**Permanent Plug and Abandonment**

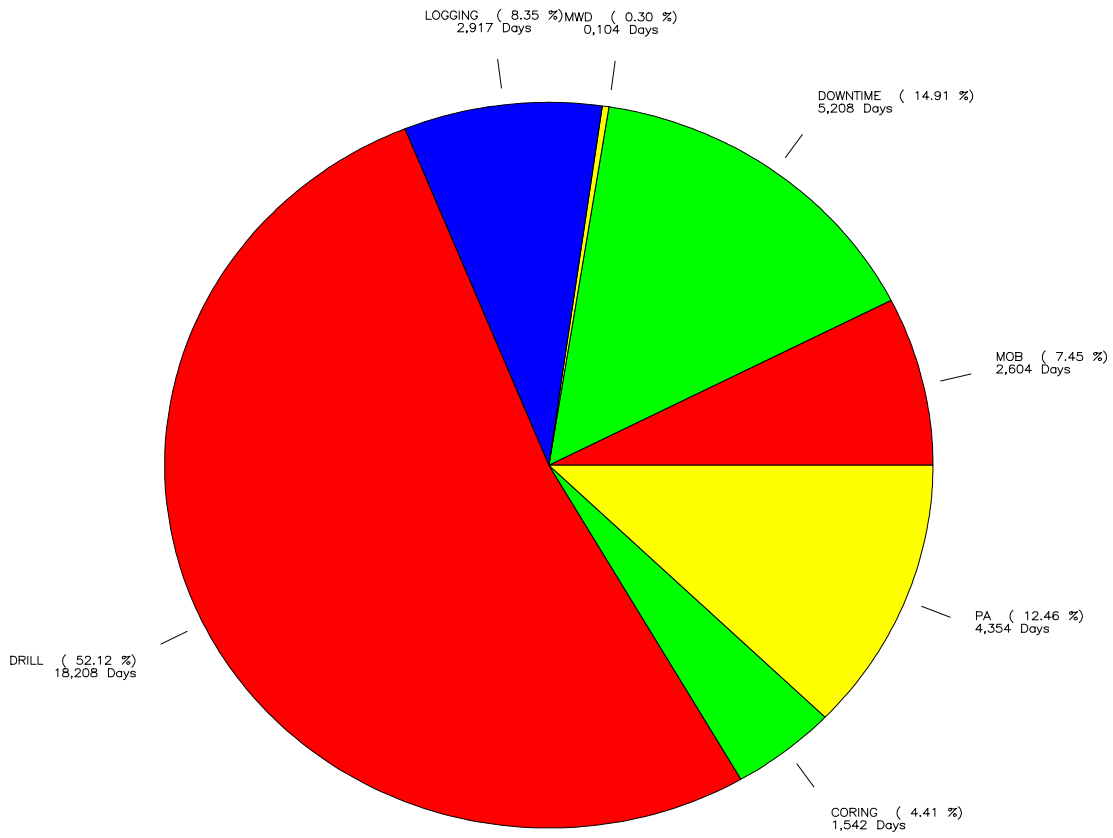
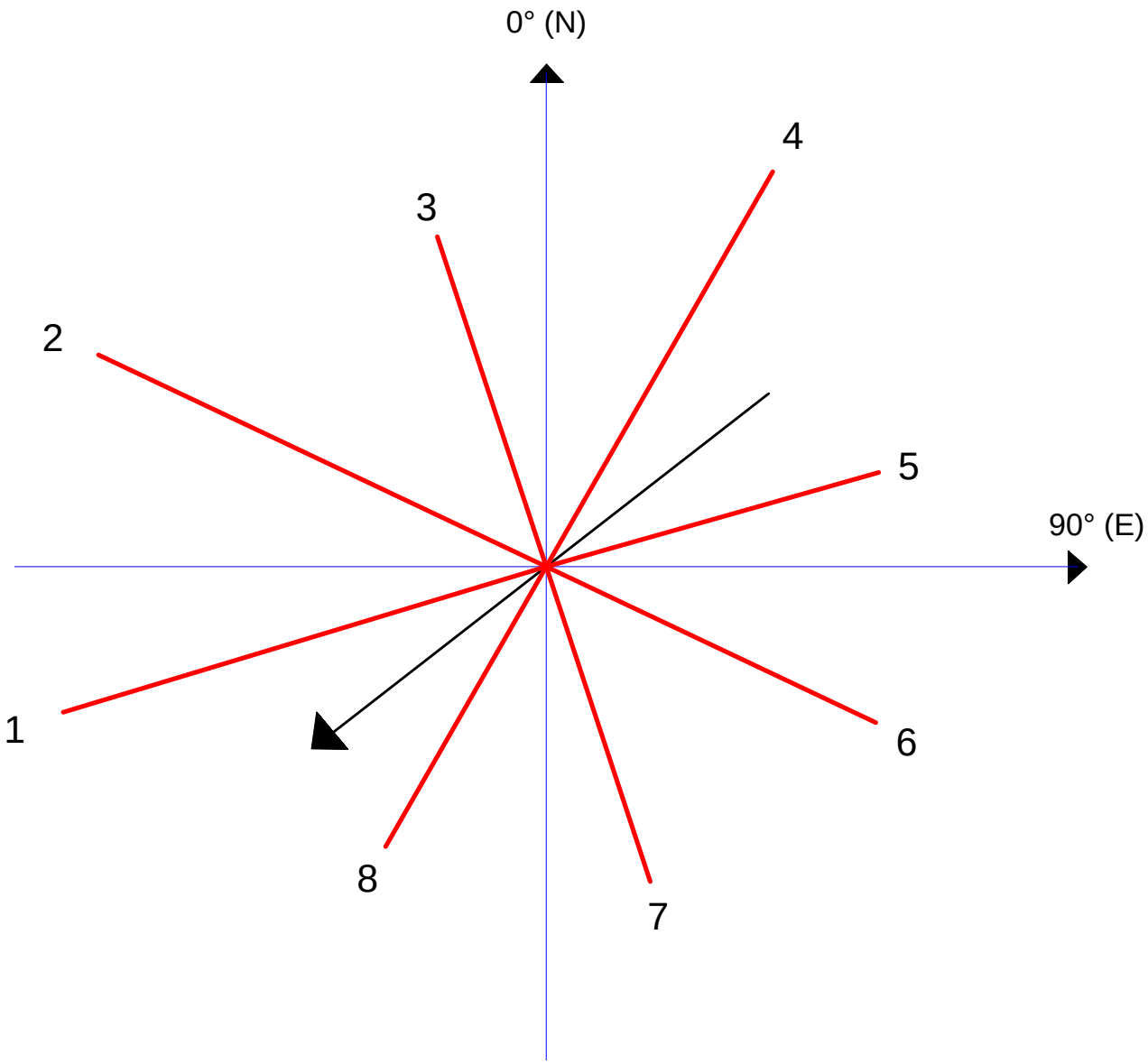


Figure 1.2		Time Distribution 30/9-20 S	**HYDRO**



RIGHEADING 230 DEG.

ANCHOR NO	DIRECTION (DEG.)	LENGTH (m)
1	252	1523
2	297	1506
3	343	1114
4	28	1444
5	73	1041
6	117	1109
7	163	1063
8	208	1024

Figure 1.3		RIG ANCHORS TRANSOCEAN ARCTIC 30/9-20 S	**HYDRO**

SECTION C

COMPLETION LOG

LITHOLOGY LOG

CORELOG

GASRATIO LOG

POST SITE SURVEY PANEL